Flowering Plants of Sholas and Grasslands of the Nilgiris

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Taramani, Chennai - 600 113

Hill Area Development Programme
Udhagamandalam - 643 001

2013

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Cover page photo : A view from Shola forest of Sispara

ISBN No. : 978-81-900346-9-2

Published by
Institute of Forest Genetics and Tree Breeding
Coimbatore - 641 002.

Printing
PRDAG PRINT
Coimbatore - 641 012.
Ph : 0422 3059034
E-mail : prdagprint@gmail.com

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पर्यावरण एवं वन मंत्रलय
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Minister of State (Independent Charge)
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New Delhi - 110 003

MESSAGE

Tamil Nadu has rich forest eco systems with varied forest types and vegetation complexity holding rich biological wealth. The sholas of Nilgiris is one such unique forest type which has varied land forms, that have contributed to the ecological richness of the tract. Sholas are delicate ecosystem that requires in depth studies to generate valuable information for future interventions. Inventorization of the sholas is a meticulous effort required in the era of climate change, which has its toll on the vegetation structure. Rapid land use changes, anthropogenic pressures and innumerable biotic pressures have made it necessary for taking stock of the shola vegetation and monitoring them meticulously. This book with good information on shola vegetation also provides key identification characters for shola species, threats and management aspects of these fragile forest system of sholas. It is a compendium that would fulfill the need of a forester, botanist, conservationist and students of ecology and serve as a ready reference.

The Government of India has enacted the Biological Diversity Act (2002) in order to promote conservation and sustainable management of our biological wealth. All the more, since the Convention on Biological Diversity has declared 'water and biodiversity' as the theme for the International Biodiversity Day 2013, and as sholas and grass lands together serve as huge reservoirs of water up in the Nilgiris and are indicators of well managed water sheds, conservation and sustainable use of sholas and understanding the floristic elements within is the need of the hour. I find it very apt and take pleasure in releasing this valuable document on the vegetation of sholas. I congratulate the efforts taken by the authors in bringing out this contribution to forestry science at the appropriate time for use by forest departments and various other stakeholders.

Best wishes.

Jayanthi Natarajan

Jayanthi Natarajan

Printing
PRIDAS PRINT
Coimbatore - 641 012.

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महानिदेशक, भा.वा.अ.शि.य.
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सत्यमेव जयते

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FOREWORD

The Blue mountains also called 'Nilgiris' is endowed with a bountiful wealth of natural forests. The important forest type includes sholas and grasslands. This fragile mountain ecosystem has undergone changes due to various biotic pressures. Sholas are rich ecological units with several interesting vegetal elements. They are generally short, stunted forest types usually confined in the folds of the mountains and surrounded by grassiands.

The sholas are ecologically significant as they are the source of water and provide a habitat for a wide array of fauna. The sholas are intrinsically linked with the livelihood of the local people. This book is an excellent document that showcases the floristic diversity of the sholas and its associated forests. Various efforts have been taken for the protection of sholas and detailed researches have been taken on this forest type over a period of time. There is an immediate need to understand the floristic diversity of the shola ecosystem for their rehabilitation and restoration. This book will become a handy guide for foresters and botanists to understand the complex shola grassland associates which needs continuous monitoring and documentation for biodiversity gains and conservation success. Dr. N. Krishna Kumar, Director, IFGTB and his associates deserve praise for bringing out this book.

I hope this would be useful to students, foresters and researchers and perhaps some improved editions would follow.

Kantharaj Jude Sekar

डॉ. पि. बालकृष्ण
अध्यक्ष
Dr. P. Balakrishna
Chairman

राष्ट्रीय जैव विविधता प्राधिकरण
भारत सरकार
National Biodiversity Authority
Govt. of India

FOREWORD

Bioresources conservation and their management are issues that require meaningful action for a country like India that is endowed with rich biodiversity. However, a pre-requisite for managing the diversity is to know the available diversity. The sholas and grasslands of the Nilgiris, occupy a unique system in the biological assemblages of the country besides providing excellent goods and services to the people in the area. Understanding this fragile system and the elements within are essential to ensure the sustenance in this era of climate change and habitat fragmentation when forest ecosystems are undergoing rapid decline and degradations. The extent of effort required for conservation of sholas and grasslands is enormous in view of sustaining the productive values for maintaining the health and vitality of the hill ecosystems and for maintaining their protective and environmental roles.

This book on " Flowering plants of sholas and grasslands of the Nilgiris" focuses on the basic information about sholas and will serve as a valuable document for guiding foresters and environmentalists to identify, understand and appreciate the floristic elements of sholas that are innumerable. With the increasing actions to implement the Biological Diversity Act (2002) and the efforts in our country to constitute Biodiversity Committees and prepare People's Biodiversity Registers, there is an urgent need for such a field book. The book provides the profile of various flowering plants that need conservation and management care as they are significant part of the diverse forest genetic resource of the country. I wish to congratulate the authors for the excellent documentation and timely publication of this important volume.

Balakrishna, P.

Srinivas R. Reddy, IFS
Project Director

Hill Area Development Programme
Mt. Stuart Hill, Near Old SP Office Campus
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The Nilgiris

FOREWORD

The Southern Montane Wet Temperate forests and its associates are rich vegetation types that have added ecological significance to the Nilgiris. The sholas with the young leaves, mosaic of colours in dense canopy amidst the vast landscape of grasslands have rich floristic elements with top storey, secondary and ground flora. The Hill Area Development Programme has been supporting restoration of sholas and grasslands from 1975. Sholas contribute immensely to ecological, economic, anthropological and social development of the inhabitants of the Nilgiris and rightly judged as contributing from 'cradle to coffin' particularly to the tribal community of Nilgiris. The working plans of the Nilgiri forest division, account interestion facts about sholas and grasslands. However such sensitive ecosystems are subject to plethora of anthropological threats leading to its rapid disappearance. HADP which endeavours to work for sustainable water shed management will be a constructive partner in this scientific endeavour of IFGTB to be part of this most useful publication which has meticulously documented the elements of sholas and grasslands. I am sure this document would serve as an excellent handbook for foresters and researchers.

Srinivas R. Reddy

डॉ. एन. कृष्ण कुमार, भा.व.से
निदेशक
Dr. N. Krishna Kumar, IFS
Director

वन आनुवंशिकी एवं वृक्ष प्रजनन संस्थान
भारतीय वानिकी अनुसंधान एवं शिक्षा परिषद
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PREFACE

Sholas and grasslands are fragile ecosystems which have been of interest to foresters and researchers owing to its rich biodiversity and uniqueness. It had attracted the British in the early days and till today serves the local people in multitude of ways. Being part and parcel of day-to-day life, along with its sprawling diversity, sholas and grasslands have always been a mark of esteem to the ethnic communities of the Nilgiris. Closely observing sholas as a forester and researcher has enabled us to bring out this document which will guide in identification of innumerable floral forms within the intricate ecosystem of sholas. In the era of climate change when plant species are getting phased out a rapid pace, it is essential that the diversified floral elements are documented for reference by future generations. Though the working plans of the forest department have listed out shola species at length, and even today when Shri Ranganathan's theories on sholas and grasslands are issues of ecological debate, the elements of floral diversity within the shola is less understood by field foresters. A compilation of floral elements of sholas were initiated in 1990-1992 by the first and the second authors under the Hill Area Development Programme (HADP) when they attempted to make an inventory of the shola and the grassland species. A compendium titled, "Documentation of vegetation in sholas and grasslands and a study on the effect of fencing around sholas" was then brought out and deposited in the libraries of Nilgiris South and North Division, which has mostly photographic and line drawing illustrations of nearly 250 species inventorised in the Pykara and the Wenlock sholas of the Nilgiris. This study was further strengthened by the seminars such as, "Restoration of shola forests in the Nilgiris" conducted in 1992 at Ooty by the Tamil Nadu Forest Department and "Ecological concerns and policy issues as relevant to the Nilgiris" conducted in 1994 at Ooty by the first author under HADP support. The interest on sholas sustained even when the first author continued to work in different capacities in the forest department and now with the Institute of

Forest Genetics and Tree Breeding (IFGTB), Coimbatore while the second author worked with Tamil Nadu Forest Department at Nilgiris and later with Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore. The second author sustained his interest in sholas and grasslands as a senior scientist at Centre for Medicinal Plant Research, Arya Vaidyashala, Kotakkal and presently as Assistant Professor, Department of Botany, Sree Krishna College, Guruvayur. The third author is a botanist with rich experience in taxonomy and has worked in FRLHT and Himalayan Forest Research Institute, Shimla. The fourth author is a seed technologist with experience in shola seed biology and is presently the Head of the Seed Technology Division of IFGTB. This compilation which illustrates 641 plant species not only includes the true elements of sholas and grasslands but also the associates and the introductions made over a period of time in the tract. It also describes the taxonomical features of the species, its distribution, propagation and uses. The information on history, geology, climate, soil, rainfall, threats and management aspects gives a holistic outlook of sholas for better conservation approaches. This field guide will undoubtedly be of immense use to field functionaries, students and researchers working in sholas.

N. Krishna Kumar

ACKNOWLEDGEMENTS

This book is a compendium that provides taxonomical and related information about all known flowering plants occurring in sholas and grasslands of Nilgiris for the benefit of amateurs and professionals who deal with and are in search for basic information on plants of Nilgiris engaged in different field of activities. Our sincere thanks are due to the Hon'ble Minister Smt. Jayanthi Natarajan, Ministry of Environment and Forests for the support provided for forestry research. We wish to express our deep sense of gratitude to Shri K. Jude Sekar, Director General, ICFRE, Dehra Dun for encouragement and active support in publishing this book. We sincerely thank Dr. P. Balakrishna, Chairman, National Biodiversity Authority, Chennai for his valuable foreword, words of appreciation and funding support to publish this book as a joint venture. Our special thanks are due to Shri Srinivas R. Reddy, IFS, Project Director, HADP, Ooty for financial and moral support to bring out this publication.

We are also grateful to the Principal Chief Conservator Forests and Chief Wildlife Warden, Tamil Nadu, Officers of Tamil Nadu Forest Department for the logistic facilities provided to us for the study. We wish to thank Shri T.S. Srinivasamurthy, Addl. PCCF- Working Plan and Dr. Manoj Kumar Sarcar, Chief Conservator of Forests- Working Plan, Tamil Nadu Forest Department for providing us the needed information. We wish to thank Shri T.P. Raghunath, Group Co-ordinator Research, IFGTB for his constant support. We thank Shri Badrasamy, DFO- South and Shri Sugirtharaj, DFO- North for the support rendered for referring the old herbarium specimens deposited at Interpretation centre, Kotagiri and Cairn Hills, Ooty, respectively.

Our special thanks are due to Prof. D. Jayaprasad, Principal, Sree Krishna College, Guruvayur for providing permission to Dr. P. S. Udayan to take up the extra responsibility to convert the valuable taxonomical data on Sholas collected over a period of time into a book. The authors would like to thank many who have helped us in photograph credits and few among them who need special mention are Dr. N. Sasidharan, Scientist (Rtd.), B.P. Pal, Fellow, KFRI, Dr. P. Sujanapal Scientist, KFRI, Mr. K.A. Anilkumar, Field Officer, Spices Board, Mr. A.J. Robi, Research Fellow, KFRI, Mr. Anoop P. Balan, Field Assistant, Spices Board and Dr. S.V. Pradeep, Associate Professor, N.S.S. College, Vazhoor, Kottayam,

Dr. K. Kishore Kumar, Assistant Professor, NSS College, Manjeri, Dr. Jomy Augustin, Associate Professor, St. Thomas College, Pala.

We wish to thank all those interested in sholas and grasslands and who have worked in this tract, created awareness about the significance of its conservation.

N. Krishna Kumar
P.S. Udayan
S.P. Subramani
R. Anandalakshmi

ABBREVIATION

BMR	:	B Malla Reddy
ca	:	*circa*, near about
DDR	:	D Dhrarmaraj
DG	:	D Ganesan
E	:	English name
FRC	:	Fischer Herbarium, IFGTB
HADP	:	Hill Area Development Programme
ICFRE	:	Indian Council of Forestry Research and Education
IFGTB	:	Institute of Forest Genetics and Tree Breeding
K	:	Kannada name
KNS	:	K N Subramaniyan
KRS	:	K R Sasidharan
M	:	Malayalam name
MPRR	:	M P Rama Rao
MRN	:	M Ranganathan
NBA	:	National Biodiversity Authority
NDB	:	N D Bagad
NKK	:	N Krishna Kumar
nom. cons	:	Conserved name
PFF	:	P F Fyson
PKU	:	P K Umal Kar
PSU	:	P S Udayan
SAF	:	S A Farid
SS	:	S Sampath
ssp	:	subspecies
T	:	Tamil name
TNFDH	:	Tamil Nadu Forest Department Herbarium
TRR	:	T R Rajagopal
var.	:	variety

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INTRODUCTION

The Nilgiris otherwise known as the Queen of Hills or Blue Mountain is one of the important biodiversity hotspots of South India in Tamil Nadu. It is located between the latitudinal range of 11°10' to 11° 45' N and longitudinal dimensions of 76°14' E to 77° 2' E covering an area of 2453 sq. km. The Nilgiris is situated at an elevation of 900 to 2636 metres above mean sea level. The highest elevation is the peak of Doddabetta, which lies at a height of 2,595 meters from the msl. Nilgiris is bounded on North by Karnataka State, on the West by Coimbatore and Erode districts, South by Kerala State and Coimbatore district and on the East by Kerala State. Nilgiris comprises six taluks namely Udhagamandalam or Ooty, Coonoor, Kotagiri, Gudalur, Kundah and Pandalur. It houses forest area of 1,42,577 hectares and harbours rich plant diversity, both exotic and native.

H. G. Champion and S. K. Seth in the 1930s and 1960s, while classifying the phytogeographic zones in the Indian subcontinent, identified that the Southern Montane Wet Temperate Forest and grasslands exist in the high altitudes of Southern Western Ghats. In the Southern Western Ghats, the hilltops and plateaus found 1800 m above the sea level harbour the special kind of shola forest and grassland ecosystem. The 'Sholas' are a distinct vegetation of the Nilgiris plateau holding a sizeable number of endemic plant and animal forms whose nearest relatives in the Indian sub-continent are found only in Himalayas, especially in the eastern section and in the hills of western China, Burma and Malaysia. The environmental complex that prevailed on these mountains nurtured an ecosystem that could survive in the semi-attenuated upper parts of the atmosphere.

History

Nilgiris traces its history from the days of Vishnuvardhana, King of Hoysalas, who had offered the peak of Nila Mountain (presumably Dodabetta) to Lakshmi, the Goddess of Wealth (Pai Mohan, 2009) as a war victory offering. The original inhabitants of the Nilgiri Hills were the Toda, Kota, Soliga, Irula and Badaga tribes. The other tribal communities include Paniyas, Mullukurumbas and Kattunaikans. The Nilgiri Hills were part of Chera Empire in ancient times. Later, the area came under the rule of the Western Ganga Dynasty, and then Hoysala Empire in the 12th century. They then became part of the Kingdom of Mysore of Tipu Sultan who later surrendered them to the British in the 18th century.

The first European settlers to Nilgiris were the Portugese in 1602 followed by the British East India Company since 1799. This was followed by more ventures into

the mountains by the British survey departments. In 1819, John Sullivan, the British Collector of Coimbatore, set out to explore the Nilgiris by obtaining an order from the British East India Company. After an expedition that lasted for six days and loss of the lives of some of the expedition members, Sullivan finally reached a plateau from where he proudly hoisted the British flag. In 1822, he constructed the first house called the 'Stone House' in the Nilgiris on a hillock in Ooty, to the east of the present racecourse. From 1820s, the hills were developed rapidly under the British Raj because most of the land was by then privately owned by British citizens. Nilgiris was a popular summer and weekend getaway for the British during the colonial days. With the occupation of the Nilgiris by the British, and their efforts to make it the summer capital of Madras Presidency, roadways and the railway systems were established in the Nilgiris (Map 1).

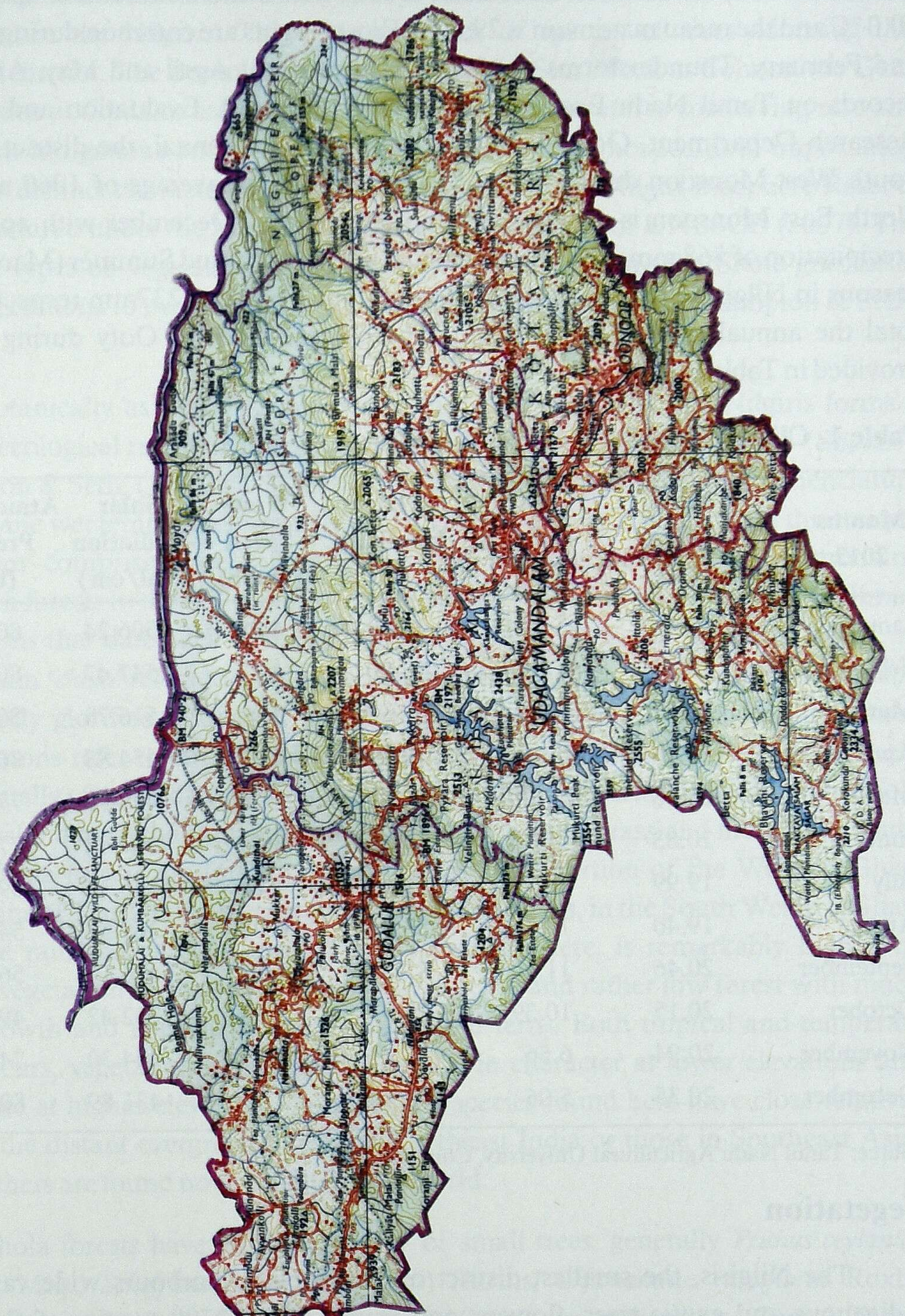
Geology and Soil

Geologists hypothesize that the Nilgiris has come into existence due to uplift by block faulting while some views suggest that it is relic feature carved out by erosional processes. The Nilgiri ranges comprise Archaean metamorphic rocks which include charnockite, biotite gneiss, magnetite quartzite, hornblende granulite, pegmatite, dolerite and quartz veins. Small enclaves of schistose rocks such as talc chloride schist and chlorite schist occur in areas bordering Kerala state. It is interesting to note that the higher elevation on the Nilgiri plateau is made up of charnockite, while the plains are composed of gneisses. Thus the difference in the topographic elevations has a bearing on the nature of rock type present. Landslides are of frequent occurrence due to the thickness of the weathered rocks and presence of steep hill slopes (Gopalakrishnan, 1996).

The soil is derived from gneiss rocks, which give rise to ferruginous clay. The soil types commonly found are clay, clay-loam and loam. They are highly acidic with a pH ranging from 4.5 to 6 (Mathur *et al.*, 1984). These soils contain a high percentage of iron and alumina and the soil is deficient in phosphate, nitrogen and potassium. The soil moisture and soil temperature of the sholas are maximum as compared to all other vegetative covers. Shola soil contains coarse sand 12%, fine sand 10.8 %, silt 10.9 %, clay 65.7 % and organic carbon 4.05 % up to a depth of 15 to 30 cms.

Climate

Nilgiris lies within the Western Ghats and is categorized as High altitude and hilly region under agro-climatic zonation. Although situated in the tropics, Nilgiris



Map - 1 A Physical Map of Nilgiris

enjoys a subtropical to temperate and equable climate by virtue of its altitude. The general climatic condition in this district is cool. The mean minimum temperature is 10.0 °C and the mean maximum is 29.8 °C. Frosty nights are common during January and February. Thunderstorms are frequent throughout April and May. As per the records on Tamil Nadu Economic Appraisal (2005-06), Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai, the district receives South West Monsoon during June - September with an average of 1060 mm. The North East Monsoon is experienced during October - December with an average precipitation of 368 mm. The Winter (January- February) and Summer (March-May) seasons in Nilgiris experiences average rainfall of 31mm an 237mm respectively. In total the annual rainfall is 1696 mm. The climate data for Ooty during 2012 is provided in Table 1.

Table 1. Climate data for Ooty during 2012

Months 2012	Maxi. Temp. (°C)	Mini. Temp. (°C)	Relative Humidity (%)	Wind Speed (kmph)	Solar Radiation (cal/cm²)	Atmospheric Pressure (hPa)
January	20.16	3.25	79.32	4.98	506.24	802.84
February	20.72	4.06	72.00	4.77	547.47	802.79
March	22.57	6.51	73.68	4.98	516.78	803.26
April	23.08	9.46	77.51	4.52	454.88	802.66
May	23.58	11.00	80.16	4.16	408.91	776.07
June	20.83	12.92	79.86	5.24	349.42	774.05
July	19.99	13.23	71.98	4.84	346.37	696.93
August	19.40	13.15	83.25	6.07	369.51	542.65
September	20.46	11.50	83.04	5.13	426.17	560.86
October	20.15	10.39	70.51	3.03	332.42	491.94
November	20.94	6.56	78.31	3.95	444.30	740.99
December	20.35	5.06	78.86	4.79	431.89	802.82

Source: Tamil Nadu Agricultural University, Coimbatore

Vegetation

The Nilgiris, the smallest district of Tamil Nadu harbours wide variety of indigenous and exotic trees, flowers, and fruits. About 2700 species of flowering plants, 160 species of fern and fern allies, countless types of flowerless plants, mosses,

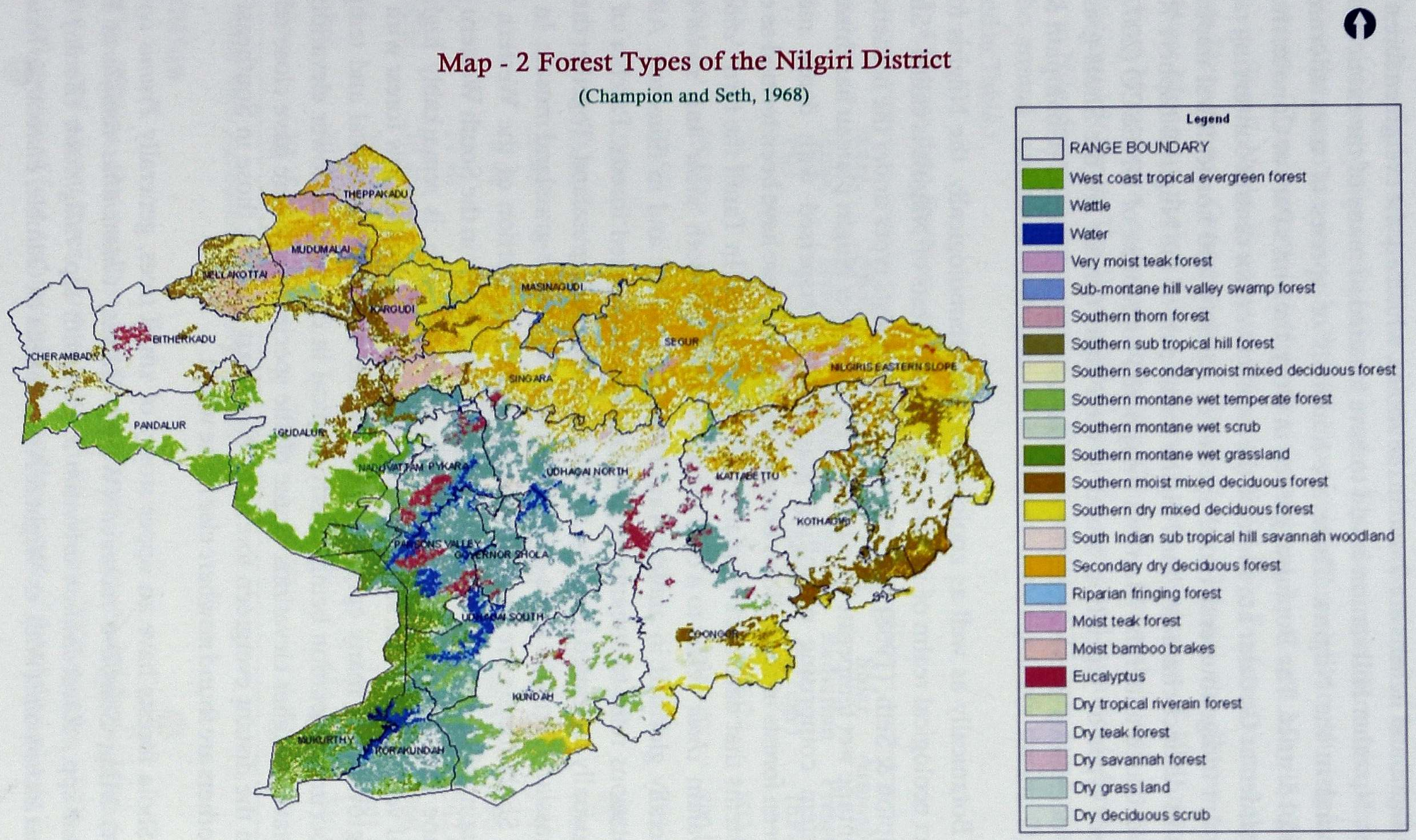
fungi, algae, and lichens are found in the sholas, which are the evergreen forest of this district. No other Hill station is said to have fostered so many of the exotic species as are found in the Nilgiris. There are hundreds of species of trees adorning this beautiful district. The Botanical garden in Ooty, the Sim's Park at Conoor, the Gene pool garden at Gudalur are some of the excellent *ex-situ* centres conserving rare and important indigenous and exotic species of forestry and horticultural importance. Given its distinct character, the Nilgiris forms part of the Nilgiri Biosphere Reserve and is declared under the Man and Biosphere Programme of UNESCO (2007). The different types of vegetation found in the Nilgiri district are the Shola-grassland, Moist-deciduous to evergreen, Dry deciduous and scrub forests (Champion & Seth, 1968).

Botanically as well as zoologically and ethonologically, the Nilgiris forms a distinct ecological realm of its own, the typical forests of Nilgiris is called "Sholas". Champion & Seth, (1968) have classified these forests types under the nomenclature of montane wet temperate forests (Map 2). The upper Nilgiri plateau has this unique ecosystem comprising of rolling grass hills interspersed with dense montane evergreen forests in the hollows between the folds. These have been termed as climax ecosystems that date back to many millions of years. In Tamil the term '*cholai*', in Malayalam '*chola*' refers to a cold place, a thicket etc. Both '*shola*' and '*sholai vanam* are literally glorified in ancient Tamil literature, songs and in films too. All these connotations refer to streams, rivulets and the associated forests. Patches of shola forest usually separated from one another by undulating grassland. Together the shola and grassland form the shola-grassland complex or shola-grassland mosaic. In South India, Shola forests are found only in the southern portion of the Western Ghats mountains of Karnataka, Kerala and Tamil Nadu states, in the South Western Ghats montane rain forests eco-region. Plant endemism here, is remarkably high. The natural vegetation of the valley is typically a dense and rather low forest with much undergrowth and many epiphytes, mosses and ferns. Both tropical and temperate flora occurs, vegetation being mostly tropical in character at lower elevations and temperate at higher elevations. Some of the species found here have close relatives only in the distant evergreen forests of Northeast India or those in Southeast Asia. Some others are found nowhere else in the world.

Shola forests have an upper storey of small trees, generally *Prunus ceylanica* (Wight) Miq., *Schefflera racemosa* (Wight) Harms, *Chionanthus ramiflorus* Roxb., *Syzigium* spp., *Rhododendron arboreum* J. E. Smith ssp. *nilagiricum* (Zenk.) Tagg., *Mahonia leschenaultii* (Wall. ex Wight & Arn.) Takeda ex Gamble, *Elaeocarpus recurvatus*

Map - 2 Forest Types of the Nilgiri District

(Champion and Seth, 1968)



Corner, *Ilex denticulata* Wall. ex Wight, *Magnolia nilagirica* (Zenk.) Figlar, *Actinodaphne bourdillonii* Gamble and *Litsea wightiana* (Nees) Hook. f. Below the upper storey is a low understorey and a dense shrub layer. These shola forests are interspersed with montane grasslands, characterized by frost- and fire-resistant grass species like *Chrysopogon nodulibarbis* (Steud.) Henrard, *Cymbopogon flexuosus* (Nees ex Steud.) Wats., *Arundinella vaginata* Bor and *Themeda triandra* Forssk. Although generally said to occur above 2000 meters above sea level, shola forests can be found at 1600 meters elevation in many hill ranges. Periodic brush wildfires are a key part of the ecosystem, helping to maintain the patchwork of grassland and forest that characterizes the sholas, and preventing the buildup of large amounts of flammable debris. However, some shola areas have suffered from excessive amounts of burning, leading to the shrinkage of forest patches and the growth of invasive species (Rawat *et al.*, 2003).

Fauna

The Western Ghats are one of the globally recognized biodiversity hotspots. Nilgiris which is a part of the Western Ghats, is home to several faunal forms like the endangered Nilgiri Tahr, the Nilgiri Marten and primates like the Nilgiri Langur. Birds like the Nilgiri Laughing Thrush are endemic to these areas. Among the many larger animals inhabiting a shola-grassland mosaic are tigers, leopards, elephants and gaur. The endangered Nilgiri Tahr (an Asian goat-antelope) is endemic to the shola-grassland, and its range is now restricted to a 400-km stretch of shola-grassland mosaic, from the Nilgiri Hills to the Ashambu Hills (Mishra and Johnsing, 1998). Laughing thrushes, Nilgiri Woodpigeons, Short wings, and some of the endemic flycatchers (Black-and-Orange and Nilgiri Verditer) are some of the 300+ species of birds that inhabit this area. The area shows high endemism and is rivaled only by the forests in northeast India.

Previous explorations

The taxonomic studies and preparation of flora of Nilgiris started 150 years ago and the prominent workers in this field were: Perrottat, Leschenailt, Wight and Schemidt. Beddome (1868-1874) published an account of Forest Flora of Nilgiris. Hooker (1906) studied the vegetation of Nilgiris and found the flora having affinities with the vegetation of Khasia, Manipur and Naga Hills. One of the important works was the publication of the flora of Nilgiris district by Fyson (1932), who described 877 species belonging to 429 genera under 117 families. Gamble and Fischer (1915-1936) made appreciable references to the Nilgiri plants in their "Flora of Presidency

of Madras". Though many of them studied the Flora of Nilgiris, studies pertaining to the sholas or the wet temperate forests proper were meager. Francis (1908) in "The Madras district Gazeteers- Nilgiris had given enough information about the sholas and also described conservation measures to be taken. Ramaswami (1912) described the sholas of Tirunelveli Hills and found some resemblances with the Nilgiri forests. Aiyar (1932) described the sholas of Palghat divisions and made silvicultuaral studies. Champion (1936) in a survey of forest types of India classified shola forests as "Southern Montane Wet Temperate Forests" and given a table showing stratification of vegetation of the Nilgiri Sholas.

Ranganathan (1938) made notable contributions on the ecological status of the sholas versus grasslands and regeneration of shola species. Bor (1938) also studied the ecological status of the sholas versus grasslands and regeneration of shola species. Kadambi (1950) had under taken similar ecological sum floristic cum silvicultural studies on the evergreen montane forests (sholas Hassan District, Mysore state. Sankaranarayanan (1958), Noble (1967) and Blasco (1971) reviewed the literature on the same controversial subject. Rage *et al.* (1959) had mentioned the uniqueness of the shola vegetation in the "Botanical Survey of the Nilgiris". It was followed by Agrawal *et al.* (1961) who studied ecology under different associations existing in the Nilgiris, trends of succession under prevailing conditions and possible introduction of secondary succession as an effective means of soil conservation. Menon (1966) studied Pollen analysis of the post-glacial deposits of several shola species from Pykara, Ootacamund. Meher-Homji (1967) studied the phyto-sociological aspects of the sholas. Noble (1967) extensively studied the shifting balance of shola forests and grasslands and stated that the fires set by pastoralists for thousands of years have contributed slowly to the spread of grasslands. The ecological status of South Indian grasslands were studied by Raghavan, (1957). Vishnu-Mittre and Gupta (1968) made phyto-sociological studies in shola community and described it a dying community, which is non-regenerating and fast receding.

Blasco (1971) noted abundance of endemic species confined to Nilgiris including certain shola species. Blasco (1970) and Vishnu-Mitre (1971) studied the origin of shola forests in the Nilgiris. Vishnu-Mitre and Gupta (1972) had estimated the initiation of the shola forests based on radiocarbon dating. Meher-Homji (1972) studied ecological diversity of shola forests in the Nilgiri district. The endemic primitive temperate elements and the relic vegetation of Kundha Range, Nilgiris was provided by Shetty and Vivekanandan during 198l. Subramanyan and Nayar (1974) gave an outline of the characteristic vegetation and phytogeographical peculiarities

of the Nilgiris. Chinnamani *et al.* (1965) gave data on the run-off and soil loss in the sholas. Sharma *et al.* (1977) made a checklist of all plants available in the Nilgiris including shola elements. Venkataramanan and Chinnamani (1978) noted the return of nutrients in the wet temperate evergreen shola forests. Samraj *et al.* (1979) conducted experiments and compared the sholas versus man-made forest with special references to interception stem flow and through fall. Dayanandan (1981) underlined the importance of shola forests and recommended immediate steps to be taken to conserve the sholas. Shetty and Vivekanandan (1981) reviewed the presence of tropical and temperate elements, ecological status and the history of the sholas. Balaji (1985) in his report discussed the characteristic features, ecological status, role in moisture conservation, and preservation of sholas. Krishna Kumar and Udayan, (1992) studied the floristic elements in a fenced and non-fenced shola in Pykara and other areas of Nilgiris through Hill Area Development Programme (HADP).

A seminar on restoration of shola forests in the Nilgiris in 1992 was probably the first known discussion on the status of sholas, and ways and means of restoration organized by the Tamil Nadu Forest Department (Krishna Kumar *et al.* 1992). Krishna Kumar (1994) brought out the proceedings on 'Ecological concerns and Policy issues as relevant to the Nilgiris', that discusses ecological problems and management of sholas in the Nilgiris. 'Forest Plants of the Nilgiris' Eastern Nilgiri Biosphere-An Illustrated Field Guide, covers the dominant plant species in the forest areas of Kotagiri and Coonoor region and the forest range from dry deciduous to evergreen type. It covers trees 92 species; climbers and liana 52 species; herbs and shrubs 48 species (Keystone Foundation, 2006). Some wild edible fruits from the Western Ghats of Nilgiri forests were studied by Udayan *et al.* (2006). Ecological status of medicinal and other economically important plants in the shola understories of Nilgiris, the Western Ghats was studied by Paulsamy *et al.,* (2007). Mohandas and Davidar (2009) studied the floristic structure and diversity of a tropical montane evergreen forest (shola) of the Nilgiri Mountains by lying out randomly placed quadrates and recorded 60 species of trees and pointed out the shola forests of the Nilgiris was similar to that of the Palni hills. About 47% of the species were common, indicating a common heritage of the shola forests of the Nilgiris and Palnis. The Nilgiris had the highest proportion of Western Ghats endemics, followed by species of Indo-Malayan affinity (Davidar *et al.*, 2007). Most of the species are abundant and widely distributed among sholas, indicating their tolerance to a stressful environment. Mohan (2008) studied the ectomycorrhizal fungi in Nilgiri Biosphere reserve. Anandalakshmi *et al.* (2012) studied the seed biology of important shola tree species and beneficial

microbes associated with the species to support shola restoration in the Nilgiris. Apart from these studies, only scanty information on the phyto-sociological, biodiversity studies in protected and non-protected areas, impact of species diversity by protection, population structure, anthropogenic pressures and other ecological features of shola forests and grasslands of Nilgiris is available.

Study Area

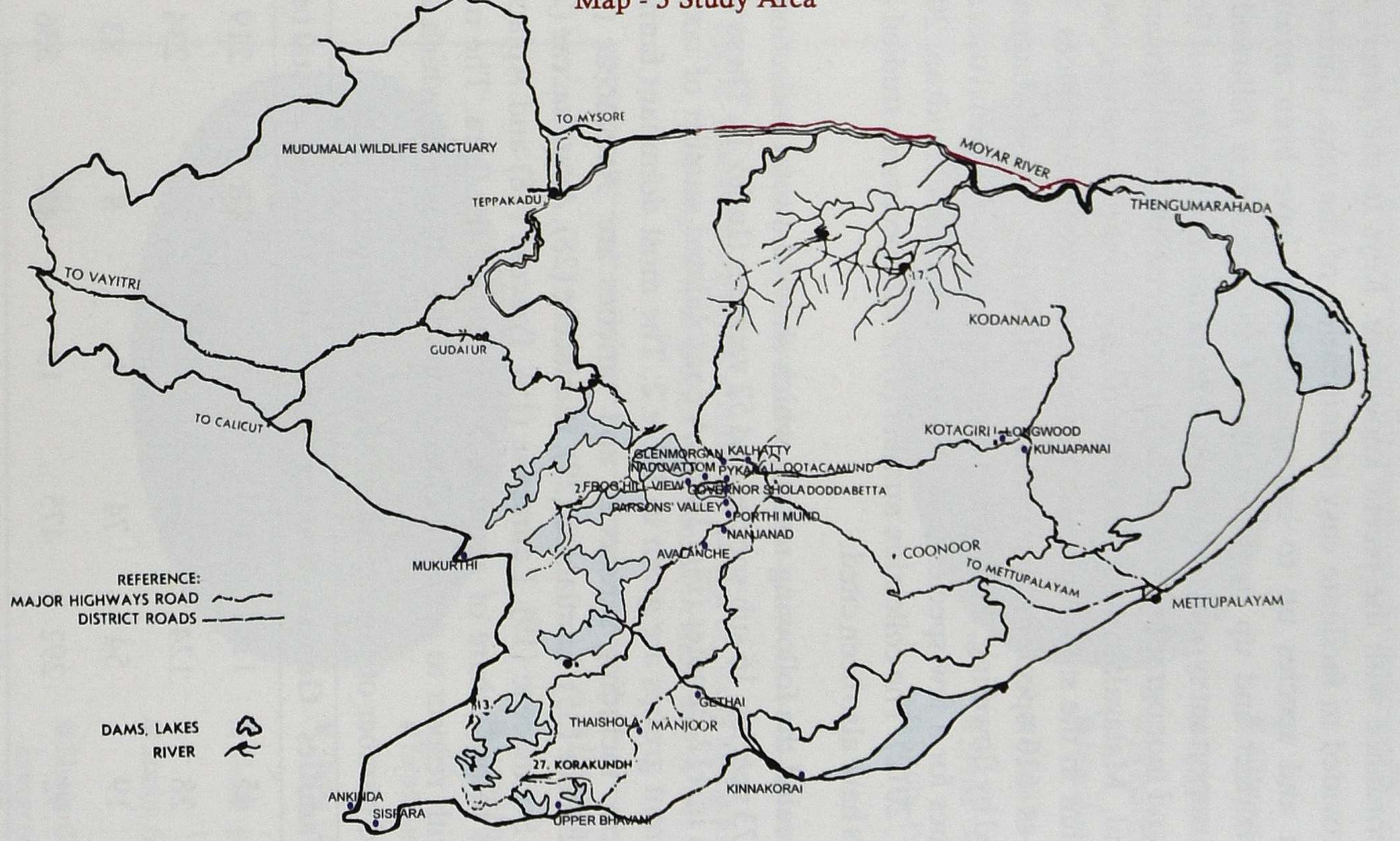
The present study deals with flowering plants of different Shola forests and grasslands of the Nilgiris district in Tamil Nadu. The study localities are shown in Map 3. The analysis of data showing the names of species with family, habit, systems of medicine, habitat, threat status etc. is presented in Index I.

Prelude to the present study

The vegetation has always been described as the most conspicuous and characteristic aspect of the area. The totality of climatic, biotic, edaphic and physiographic factors, generally determine the complexity at any place and at any stage of its development. Hence, structure and functions of the vegetation in relation to the environment form the basis for complete understanding of dynamics of an ecosystem (Bliss, 1962). Keeping the above in view, the botanical explorations in sholas and grasslands of Nilgiris was carried out.

Extensive floristic surveys were undertaken systematically and effectively covering all the study areas. These surveys were carried out over a period of several years under HADP program and other developmental programs of the forest department. During survey, relevant details of the data pertaining to the habitat, micro-habitat characteristics, phenological period of each species were collected. At the same time details pertaining to the occurrence, information and threatened status of taxa were also recorded for each of the species. Photographs of most of plants in their natural habitats, unique vegetation types were also taken as part of the documentation. Plant specimens were collected with flowers, fruits or with both to show intra-specific variations, numbered and duly labeled. Later on voucher specimens were prepared as per standard herbarium procedure suggested by Jain and Rao (1977). Plant specimens from the field, were identified using the available local floras (Fyson, 1932 and Gamble, 1915-1936). Final identification of the material was done after detailed studies and consulting relevant literature. Herbarium specimens were stored

Map - 3 Study Area



STUDY PLACES : Ankinda, Anumapuram, Aramby shola, Aravankadu, Avalanche, Bandy shola, Bangitappal, Burliar, Coonoor, Dodabetta, Dolphin nose, Finger post, Gethai, Glenmorgan, Governor shola, Gudalur, Kalhatti, Kinnakorai, Kodanad, Kokuthurai, Kotagiri, Kundha, Kunjapanai, Longwood, Madithorai, Manjoor, Masinagudi, Mukurthi, Muthorai, Mynala, Naduvattam, Nanjanad, Ooty town, Outcherloney, Parson's valley, Porthimund, Pykara, Sispara, Snowdown, Staircase shola, Thaishola, Upper Bhavani, Wenlockdowns, Western catchment, Wood brooke

at Tamil Nadu Forest Department Herbarium (TNFDH) at Kotagiri and Cairn Hills, Ooty for study of students of Botany.

In this document, families have been arranged alphabetically with necessary modifications in accordance with the recent knowledge. Keys to the genera and species have been provided to facilitate easy identification of the taxa. Under the families, the genera and species up to intraspecific level have been arranged alphabetically. The correct and up to date name of the species is followed by basionym, if any and important synonyms and also with exhaustive citations of floras and recent revisions and monographs by ICBN as far as practicable. It is followed by local names in Tamil, Malayalam and Kannada if any, common names, world distribution and habitat in the study area also provided at appropriate places. The colour photographs of 610 species are provided in 70 plates. A brief diagnostic description is followed by flowering, fruiting and ecological notes, medicinal uses and propagation techniques for a few species (Udayan and Indira Balachandran, 2009; Anandalakshmi *et al.*, 2012). The collection number (s) of the specimens studied and name of the collectors have also been cited.

The efforts revealed the following results, which showed a total collection of 641 taxa including 573 species, 16 sub-species and 52 varieties (Index I). These taxa belong to 366 genera in 112 families (Fig. 1&2). A consolidated number of taxa as collected under different groups are given in Table 2. The most dominant families with respect to species including subspecies and varieties are: Asteraceae (53), Orchidaceae (43), Fabaceae (35), Lamiaceae (29), Rubiaceae (28), Acanthaceae (25), Balsaminaceae (19), Solanaceae (19), Lauraceae (19), Poaceae (18) and Apiaceae (15), that contributes to bulk share of about 47.3 per cent of the flora. The most dominant families with respect to genera include more than 10 genera which are:

Table 2. Consolidated number of taxa as collected under different groups

Group	Families	Genera	Species	Subspecies	Varieties	Total taxa
Polypetalae	45	114	194	7	17	219
Gamopetalae	28	124	207	5	22	234
Monochlamydeae	19	54	74	1	8	83
Dicots	92	292	475	13	47	536
Monocots	20	74	98	3	4	105
Grand total	112	366	573	16	51	641

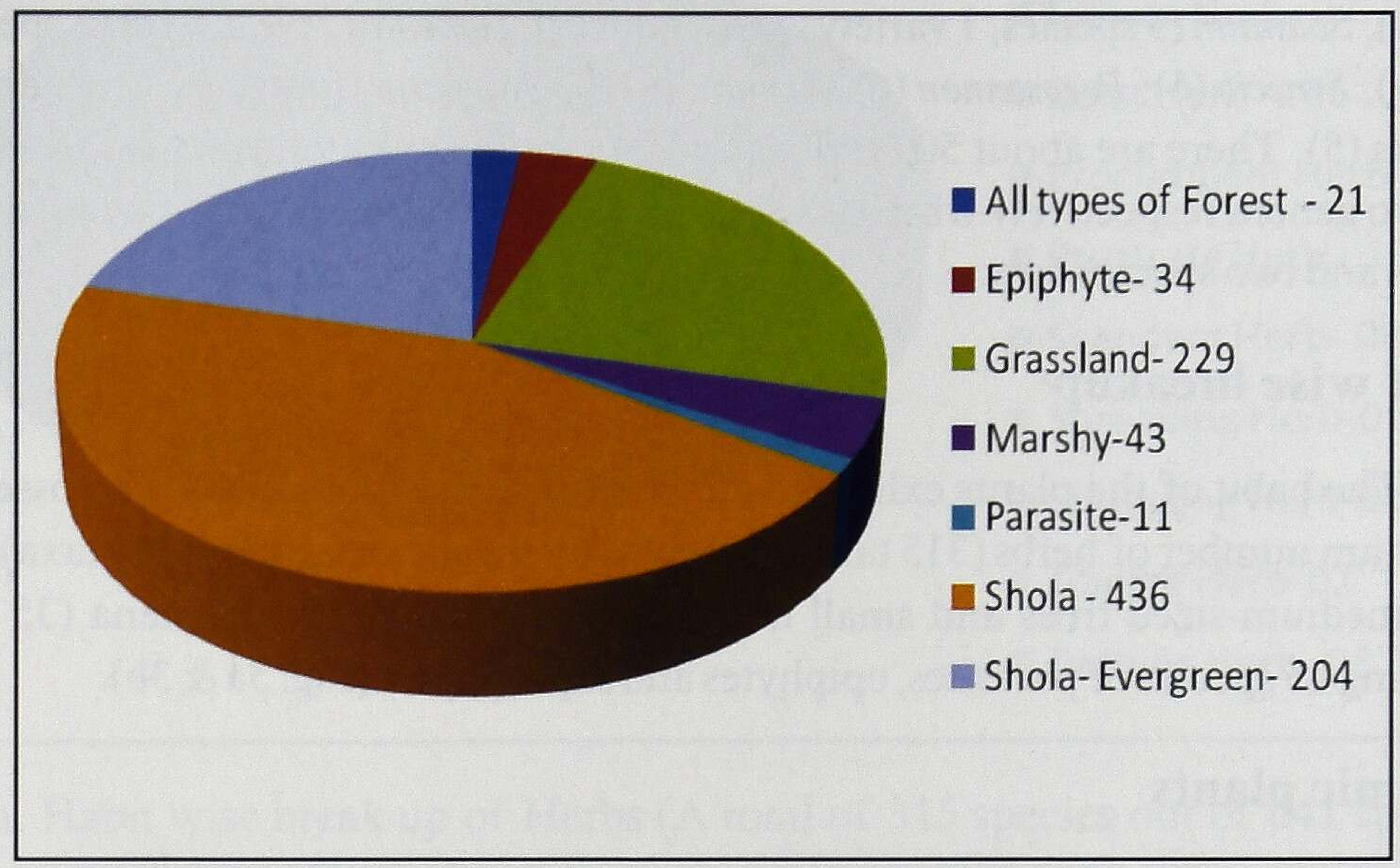


Fig. 1. Species distribution in different habitat of Shola and grassland vegetation
(A total of 436 species represented in shola out of 641 species)

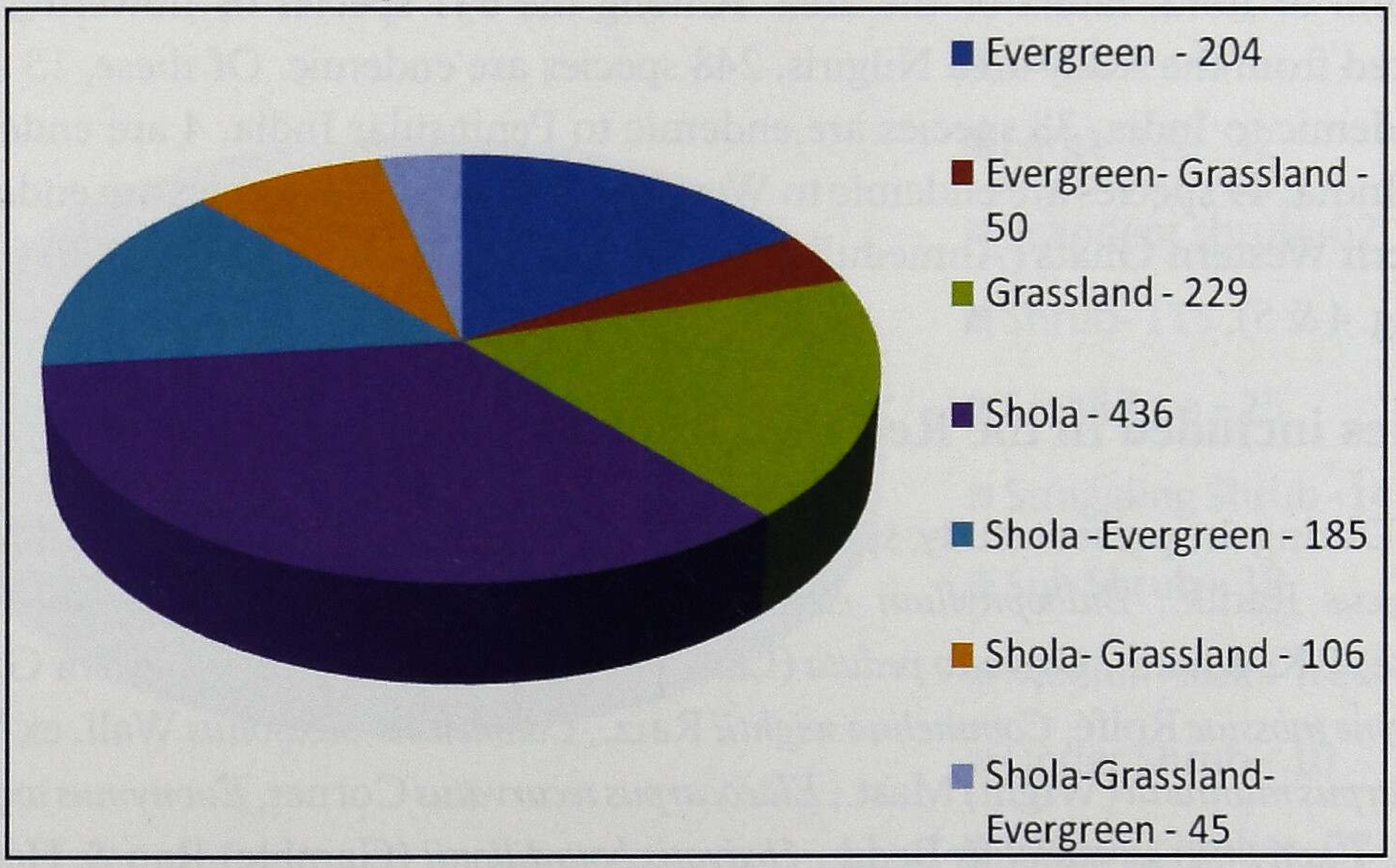


Fig. 2. Compilation of Taxa represented across different types of vegetation
(A total of 106 species represented in both Shola and grasslands
out of 641 species)

Asteraceae (32), Orchidaceae (24), Rubiaceae (17), Fabaceae (15), Poaceae (15), Euphorbiaceae (10) and Lamiaceae (10). There are 12 genera with more than 5 species in each. They are *Impatiens* (19), *Strobilanthes* (17), *Crotalaria* (11 species, 1 variety), *Solanum* (9 species, 1 variety), *Anaphalis* (9), *Habenaria* (9), *Leucas* (8 species, 1 variety), *Senecio* (6), *Pogostemon* (6), *Jasminum* (6), *Syzygium* (5 species, 1 variety) and *Polygala* (5). There are about 50 families and 24 families were represented by a single and two genera respectively whereas, 27 families and 26 families were having a single species and two species only.

Habit wise breakup

The habit of the plants exhibited all forms. Overall, the study area possesses a maximum number of herbs (315 taxa), followed by shrubs categories (179 taxa), large trees, medium-sized trees and small trees (112 taxa), climbers and liana (35 taxa), including 45 species of parasites, epiphytes and saprophytes (Fig. 3a & 3b).

Endemic plants

An endemic taxon is one which normally occurs in a small restricted area. The distribution and concentration of endemic plants in the region necessarily throws light on the biogeography of the area, areas of extinction, vicariance and adoptive evolution of flora, fauna of the area. Among the 641 species of flowering plants collected from the study area Nilgiris, 248 species are endemic. Of these, 13 species are endemic to India, 38 species are endemic to Peninsular India, 4 are endemic to south India, 49 species are endemic to Western Ghats and 144 species are endemic to southern Western Ghats (Ahmedullah and Nayar, 1987; Nayar *et al.*, 2006) (Index I and Fig. 4 & 5).

Species included in the Red Data Book

During the present study, species viz. *Actinodaphne bourneae* Gamble, *Allophylus concanicus* Radlk., *Bulbophyllum elegantulum* (Rolfe) J. J. Smith, *Bunium nothum* (Clarke) P.K. Mukh., *Cayratia pedata* (Lam.) A. Juss. ex Gagnep. var. *glabra* Gamble, *Coelogyne mossiae* Rolfe, *Commelina wightii* Raiz., *Cotoneaster buxifolius* Wall. ex Wight, *Elaeocarpus munronii* (Wight) Mast., *Elaeocarpus recurvatus* Corner, *Euonymus angulatus* Wight, *Euonymus serratifolius* Bedd., *Hedyotis bourdillonii* (Gamble) Rao & Hemadri, *Hedyotis hirsutissima* Bedd., *Memecylon sisparense* Gamble, *Ophiorrhiza brunonis* Wight & Arn. and *Vanasushava pedata* (Wight) P.K. Mukh. & Constance, those are included in the

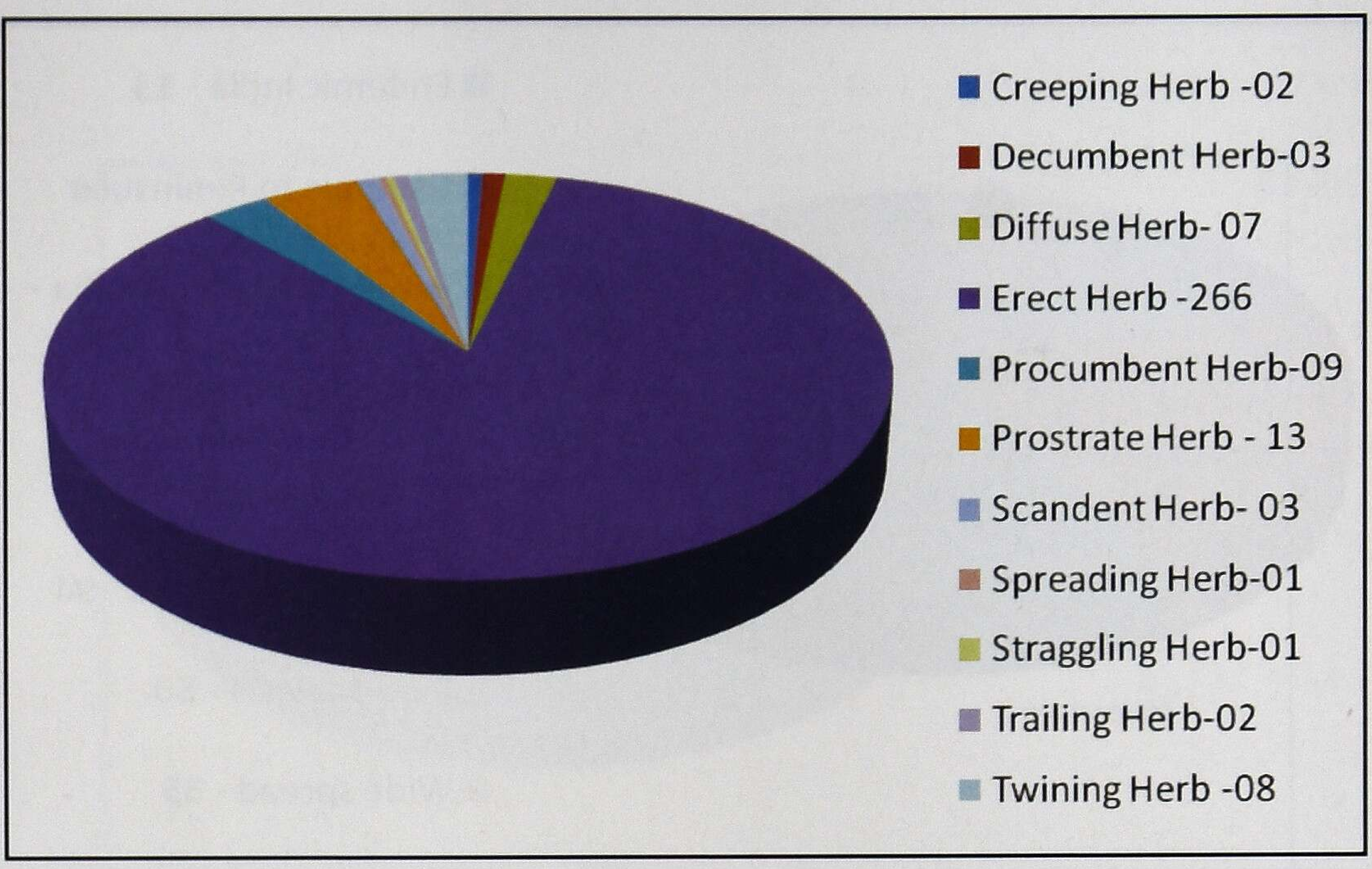


Fig. 3a. Habit wise break up of Herbs (A total of 315 species out of 641 species)

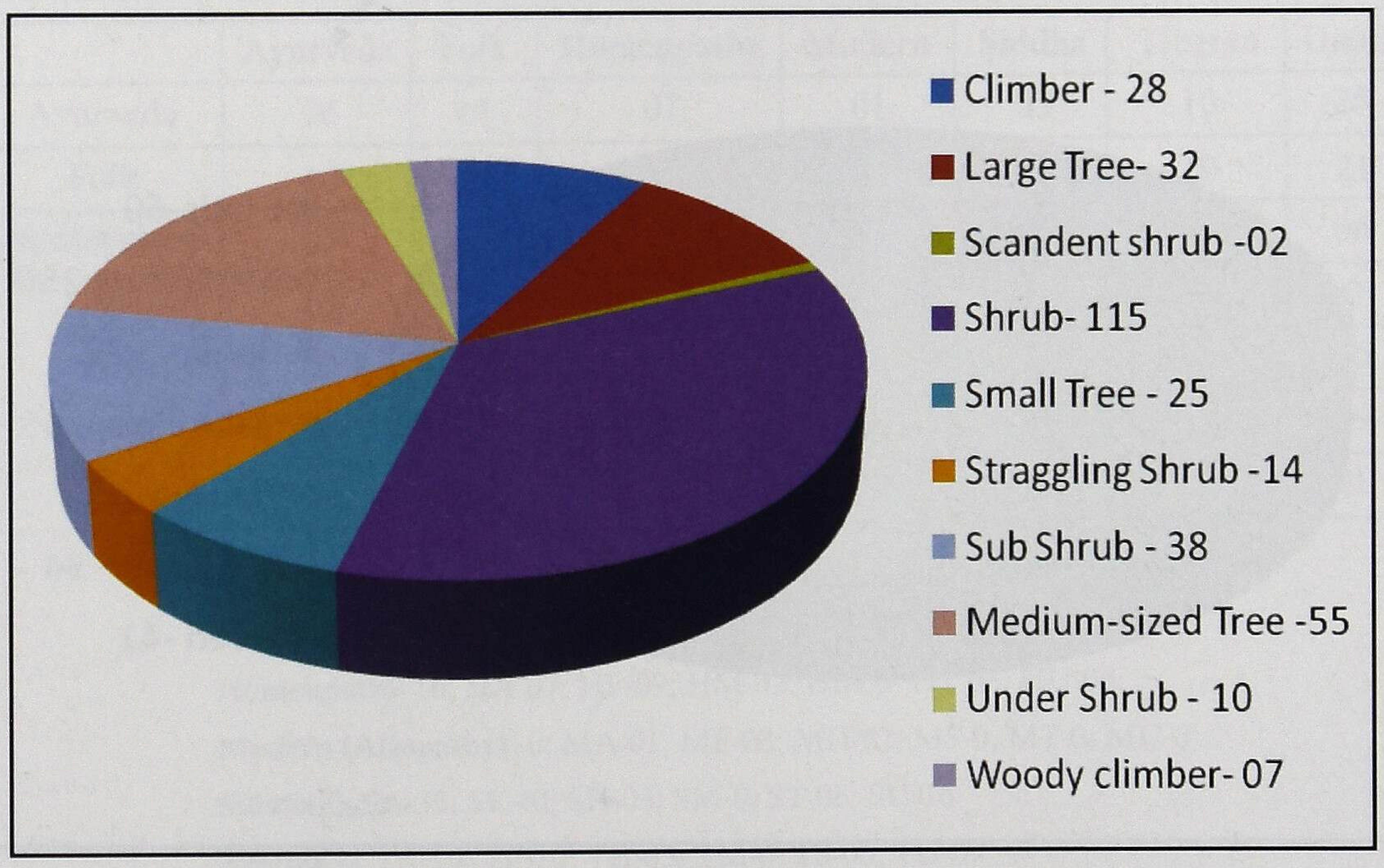


Fig. 3b. Habit wise break up of Climbers, Shrubs and Trees
(A total of 326 species out of 641 species)

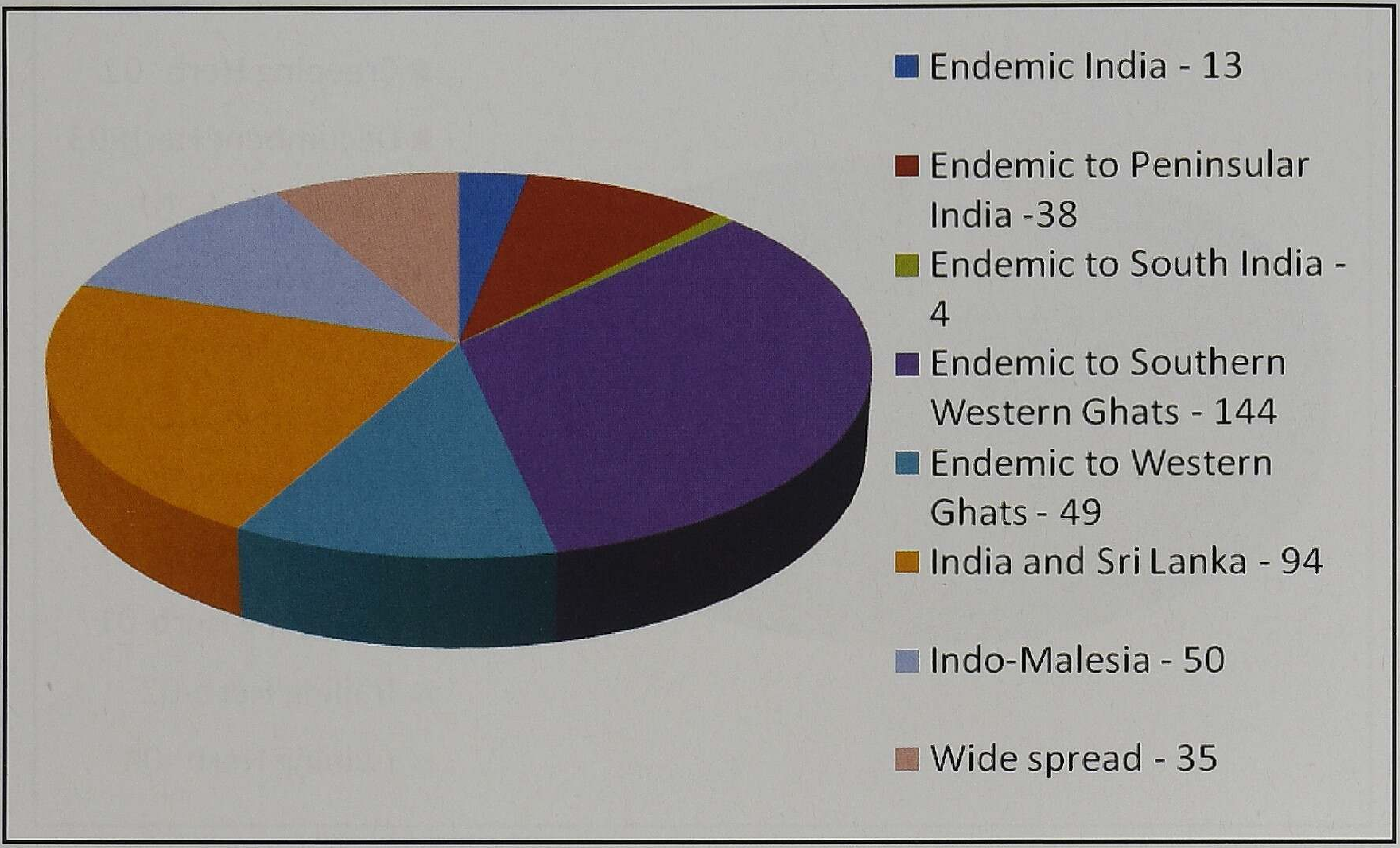


Fig. 4. Distribution status of Shola and grassland species
(A total of 248 Endemic species out of 641 species)

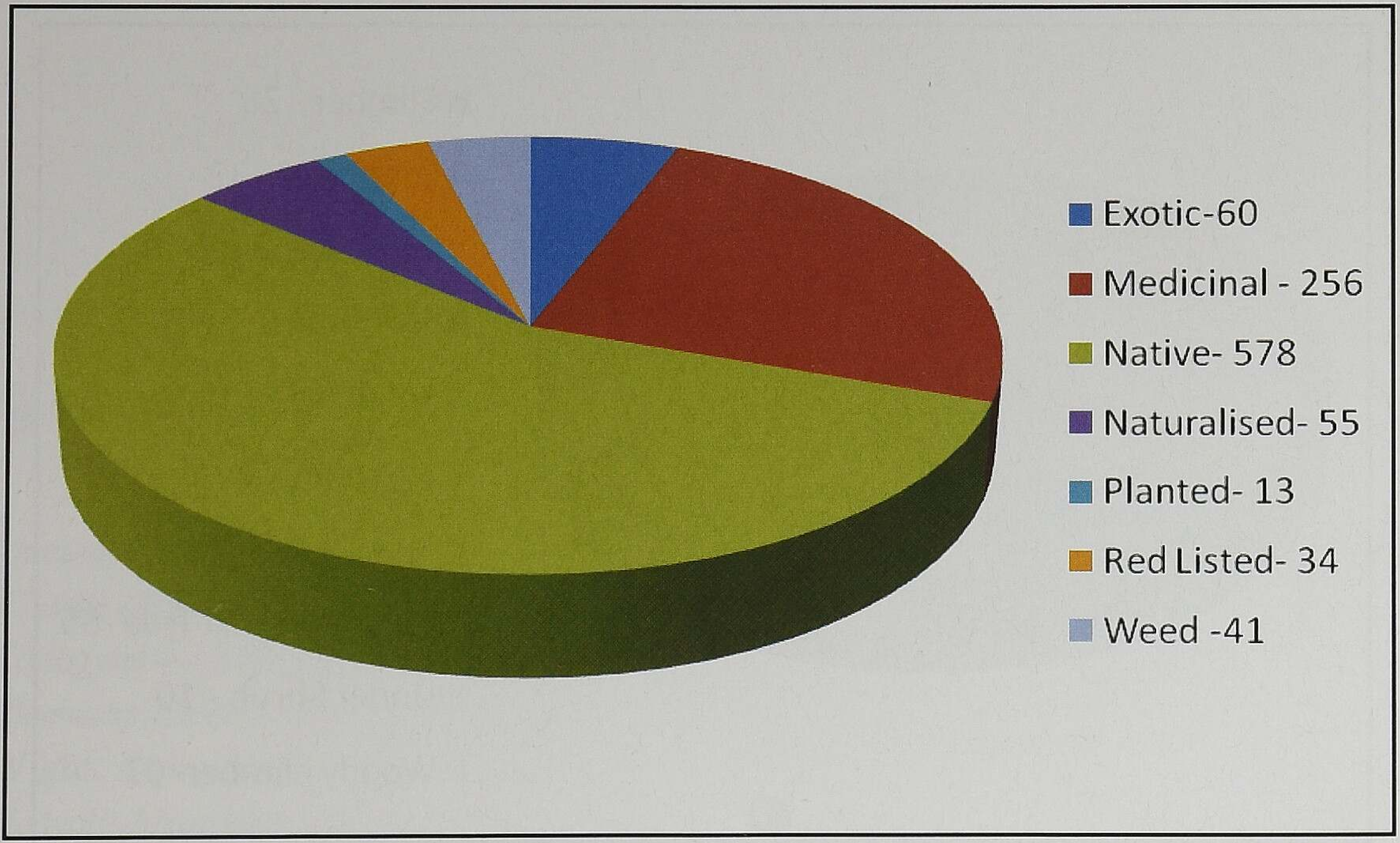


Fig. 5. Distribution status of Shola and grassland species
(A total of 578 Native species out of 641 species)

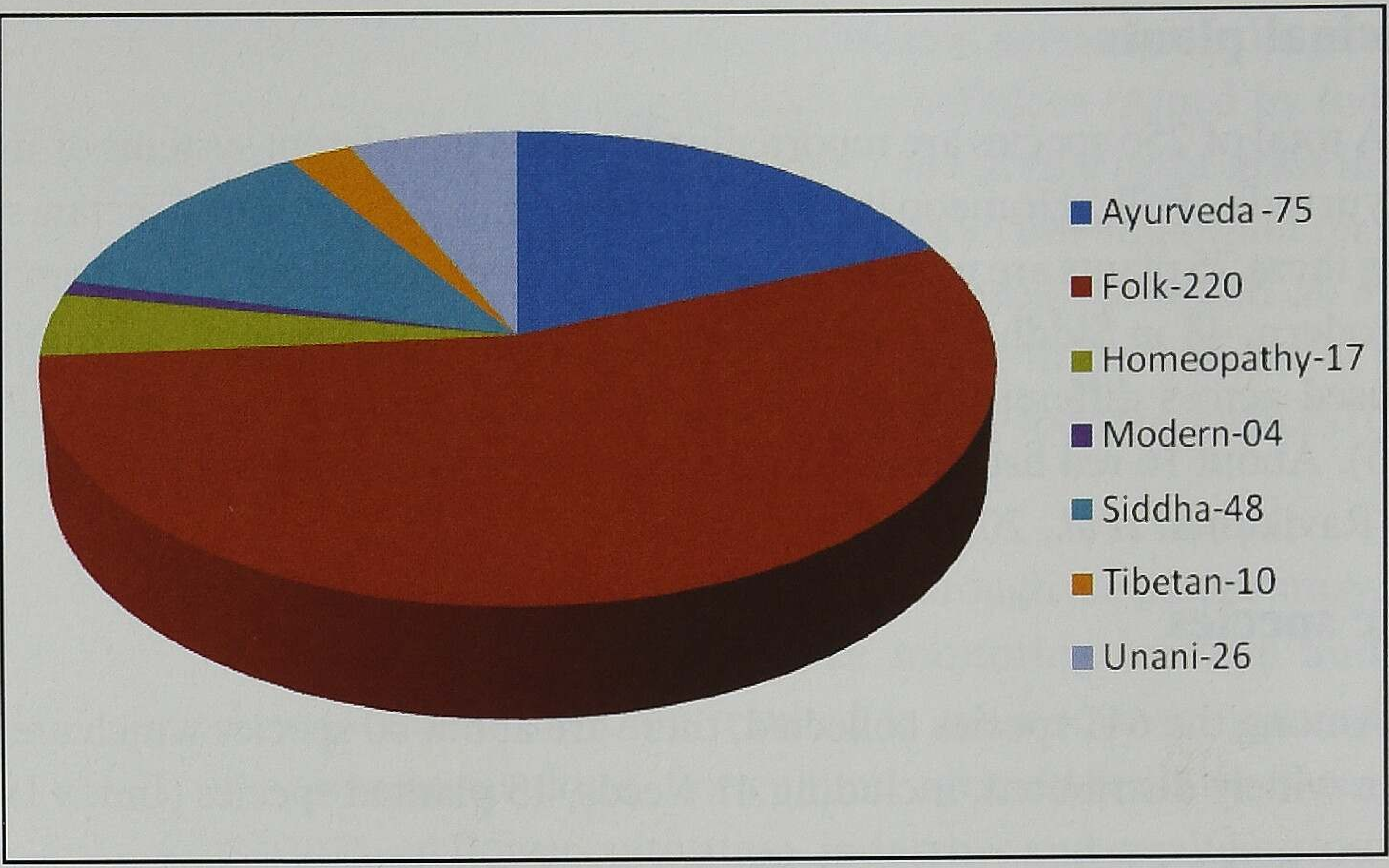


Fig. 6. Medicinal Plants used in different systems of Medicine
(A total of 256 species out of 641 species)

Table 3. Compilation of Taxa used across different system of Medicine

	Ayurveda	Folk	Homeopathy	Modern	Siddha	Tibetan	Unani
Ayurveda	16	14	07	01	33	10	25
Folk	14	154	09	03	40	10	21
Homeopathy	07	09	16	02	03	03	06
Modern	01	03	02	0	0	0	0
Siddha	33	40	03	0	0	06	16
Tibetan	10	10	03	0	06	0	09
Unani	25	21	06	0	16	09	0

Ayurveda -16; AF-14, AH-07; AM-01; AS-33; AT-10; AU-25

Folk-154; FA-14; FH-09; FM-03; FS-40; FT-10; FU-21

Homeopathy-16; HA-07; HF-09; HM-02; HS-03; HT-03; HU-06

Modern (Allopathy) -0; MA-01; MF-03; MH-02; MS-0; MT-0; MU-0

Siddha-0; SA-33; SF-40; SH-03; SM-0; ST-06; SU-16

Tibetan-0; TA-10; TF-10; TH-03; TM-0; TS-06; TU-09

Unani-0; UA-25; UF-21; UH-06; UM-0; US-16; UT-09

Red Data Book of Indian Plants (Nayar and Sastry, 1987; 1988; 1990) were collected from the Nilgiris (Index I).

Medicinal plants

A total of 256 species are reportedly to be used in different systems of medicine like Ayurveda, Folk, Homeopathy, Modern, Siddha, Unani and Tibetan systems. Among them 75 plants are used in Ayurveda, 220 species in Folk, 17 in homeopathy, 4 in Modern, 48 in Siddha, 10 in Tibetan and 26 species in Unani. Compilation of Taxa used across different system of Medicine has also been analyzed (Fig. 6 & Table 3). About 16 red listed medicinal species were also collected from the present study (Ravikumar *et al.,* 2000).

Exotic species

Among the 641 species collected, there are about 60 species which are exotics and run widely distributed, including 41 weeds, 13 planted species (Index I).

Threats and Management of Sholas and Grassland

The management of sholas has always been discussed in working plans of the forest department drawn from time to time. Sholas have undergone innumerable threats from time immemorial and also with the advent of British and establishment of military barracks. The Southern Montane Wet Temperate Forests have received best attention from foresters, researchers and conservationists. Yet, the threat to the ecosystem still looms large. Some of the important threats to sholas include annual fires, grazing, and encroachments for agriculture, plantation forestry which lead to conversion of grasslands for economically important trees, removal of soil, invasives, human intervention and a range of other threats. The impact of climate change on sholas and grasslands need extensive studies.

The forest departments under various programs, particularly under Hill Area Development Programme have taken initiatives for over two decades to restore sholas. Extensive efforts have been taken by the department like restoration, conversion of exotic plantations to indigenous species and filling up of gaps to increase the shola cover. The other initiatives of the department to protect and conserve sholas include, chain link fencing of sholas, which have brought about positive changes in degraded sholas. To protect grasslands, the department has stopped planting of Eucalypts, Wattle and other exotics completely. The Nilgiri ecosystem has been offered the best protection through acts like TNHA (Preservation of Trees Act, 1955), TN Preservation

of Private Forests Act, 1949, TN Forests Act, 1882 and Wildlife Protection Act, 1982.

Shrinking sholas and grasslands is a major concern, particularly, the grasslands which used to serve as excellent grazing grounds to buffaloes owned by todas and the wild herbivores. Frequent fires (Srivastava, 1997) and drying up of grass in winter are reasons why the cattle graze into sholas. This has been one important reason for fencing of some important sholas. Over-grazing has been identified as a factor responsible for the degradation of the forests and increase in the number of weeds. The spread of obnoxious weeds has taken away much of the fodder resources (Gadgil, 1984).

The Nilgiri plateau has undergone vast changes through the past century. Today the landscape is witnessing new pressures like mounting tourism and rapid urbanization. Even eco-tourism has only resulted in mass tourism increasing the pollution levels. Extensive horticulture, floriculture, agriculture in the form of tea plantations, vegetable and cut flower cultivation, industries and sprawling townships have choked the river systems confining them to puddles. Earlier forestry was oriented at production to support industries like paper and pulp for which extensive plantations of Eucalypts, Pines and Acacias were raised which also have contributed to landscape changes. It is no wonder that the treatment in the catchments and the disharmony in urban development have led to garbage and fertilizer flows through stream systems. The mountains and valleys which were once flourishing with rolling grasslands interspersed with sholas are now embodiment of monocultures. The biodiversity of the landscape needs extensive concern, care and control through monitoring and involvement of local watchdog units.

Nilgiris is also a preferred ground for various adventures, sports including film making thereby resulting in pressures even around the fragile protected areas like Project Tiger area- Mudumalai. The other list of anthropogenic pressures includes demand for hydroelectric projects, hospitality centres, roadways and other ills of urbanization that is largely seen in any developing township. The exotic ornamentals which were introduced long back such as *Agerantina adenophora*, *Cestrum aurantiacum*, *Ulex europeaus* etc. in the Nilgiri plateau if not checked will slowly take over the place of native flora.

It is the right time for the foresters, naturalists and environmentalists to concentrate and solve the problem of exotic weeds by way of utilizing some of these

as fire wood for the neighbouring rural masses. The people along the reserve forests are not very clear about the biodiversity conservation concept. The role of each organism in an ecosystem is largely unnoticed. At this juncture the awareness alone can bring down the incidences of destruction.

The way threats are catching up, it is time that the Nilgiris is declared an eco-sensitive zone. Inspite of legislations, landmark acts, decisions and watch groups, massive damage has been inflicted to the Nilgiri ecosystem. There are many activities that have to be regulated and strict 'do's and 'don't's to be implemented in the interest of forest conservation. Many laudable schemes and policies of the Government, implementation of innovative schemes under HADP, a "No" to plantation operations, elimination of weedy under growth within sholas and preventing the spread of wattle needs continuous implementation. Strict monitoring committees for implementation of Hill Area Conservation Authority (HACA) can alone regulate sprawling urbanization. This also requires a master plan for the Nilgiri ecosystem. Development of Nilgiri ecosystem should largely synchronize with the need of the area for larger good of the ecosystem. The watershed management programs which have resulted in saturation of some watersheds, need revisiting. Though many research institutes like Institute of Forest Genetics and Tree Breeding (IFGTB), Zoological Survey of India (ZSI), Salim Ali Centre for Ornithology and Natural History (SACON), Indian Institute of Science (IISc), Bombay natural History Society (BNHS) and others have taken up studies more concerning wildlife, there is need for periodic botanical surveys and research inputs in areas of plant animal association along with monitoring protocols. These interventions alone can bring the ecosystem back to its original status.

Shola Features

Shola forest of Sispara - A general view

Shola forest of Thaishola - A general view

Shola Features

A view of Ankinda from Sispara

A view of Mukurthi peak from 9th mile

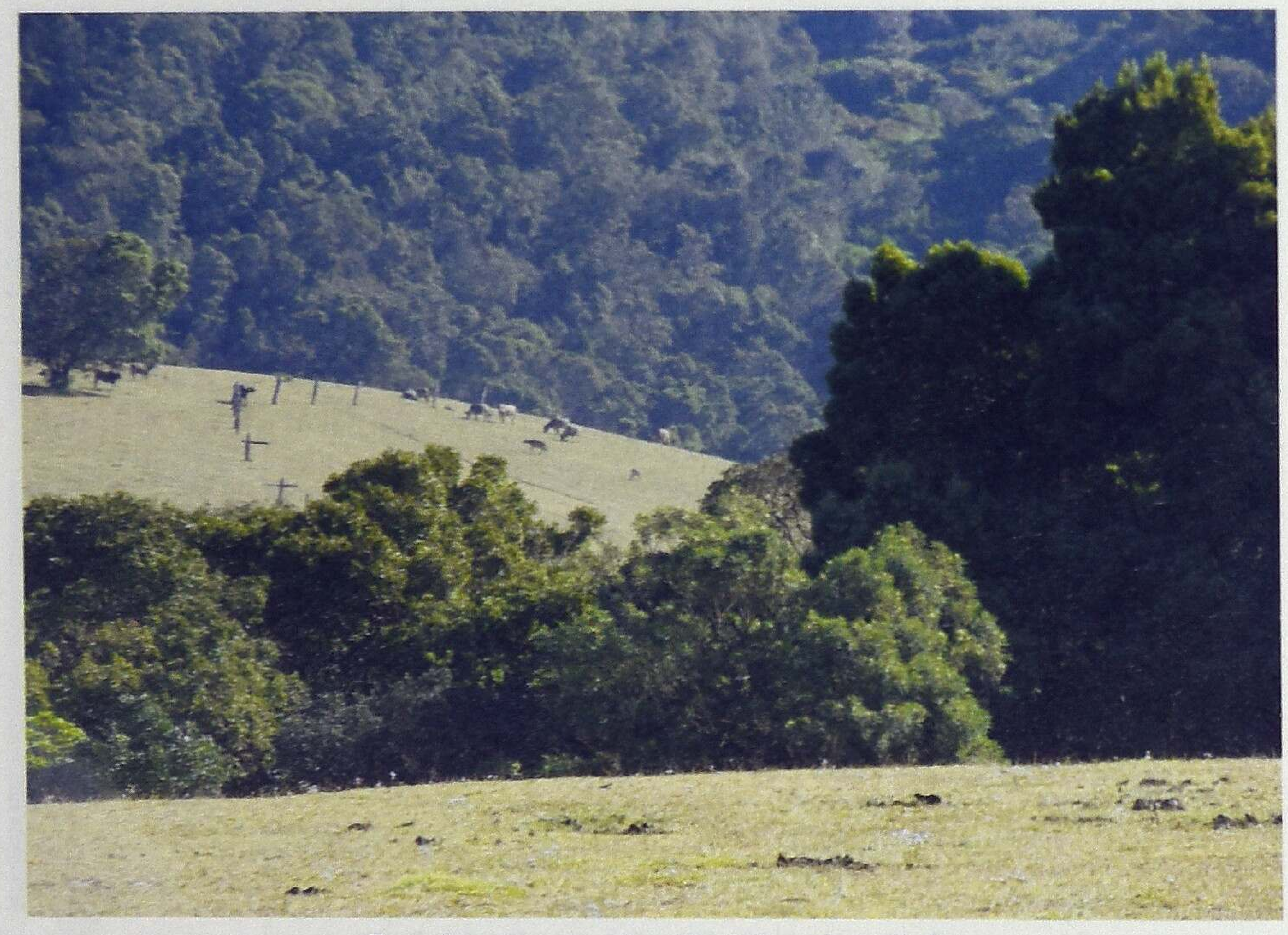
Shola Features

A grassland showing dried plants during summer in Western catchment

A shola patch under destruction at Pykara

Shola Features

Acacia plantation near the Pykara water falls



Grazing in grassland of Sandynallah

Shola Features

Occurrence of a rare tree gymnosperm Cyathea in Naduvattam

Shola tree trunks fully covered by mosses, ferns and epiphytes

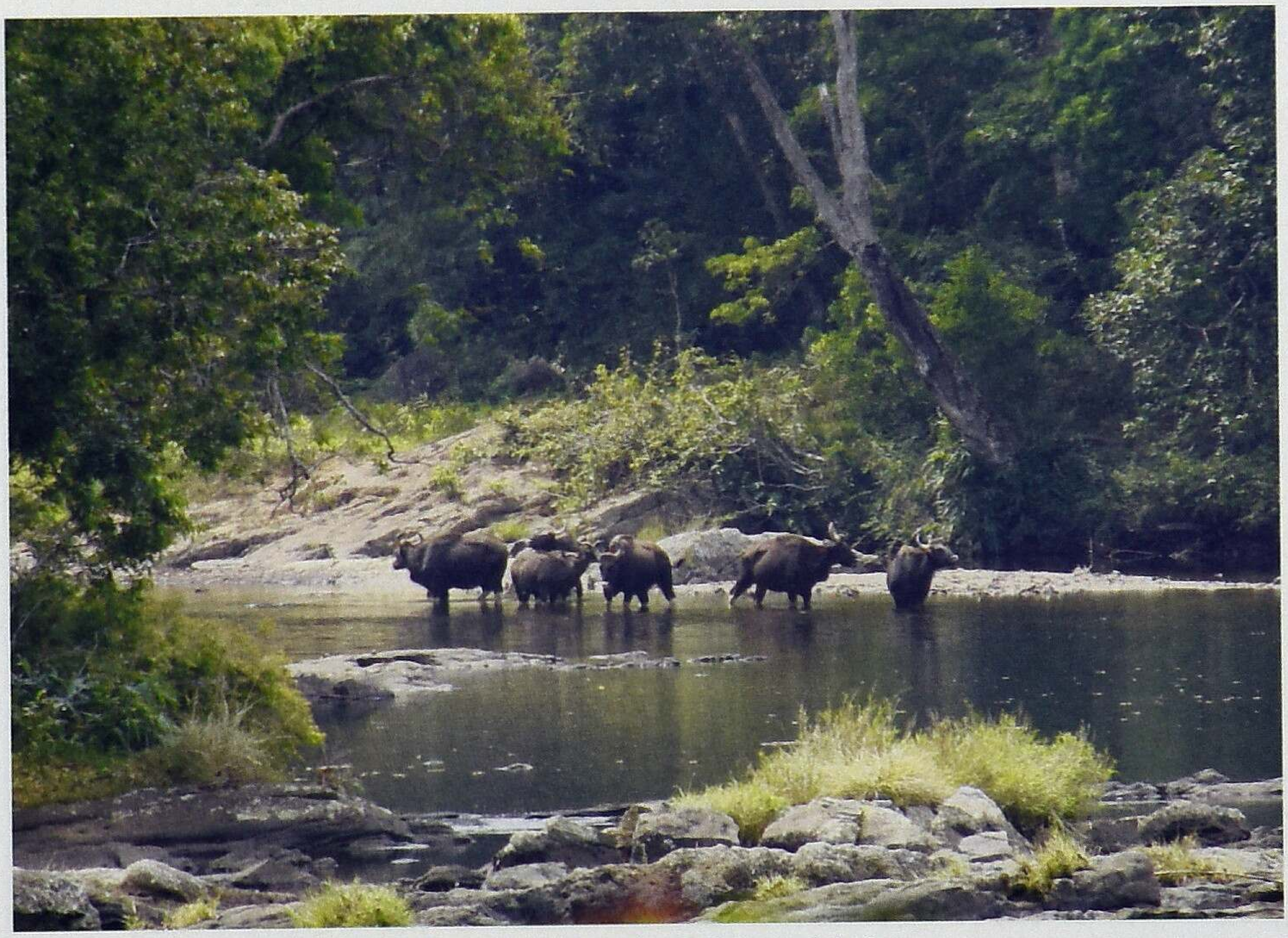
Shola Features

Water reservoir at Porthimund

Marshy vegetation showing sedges in Pykara

Shola Features

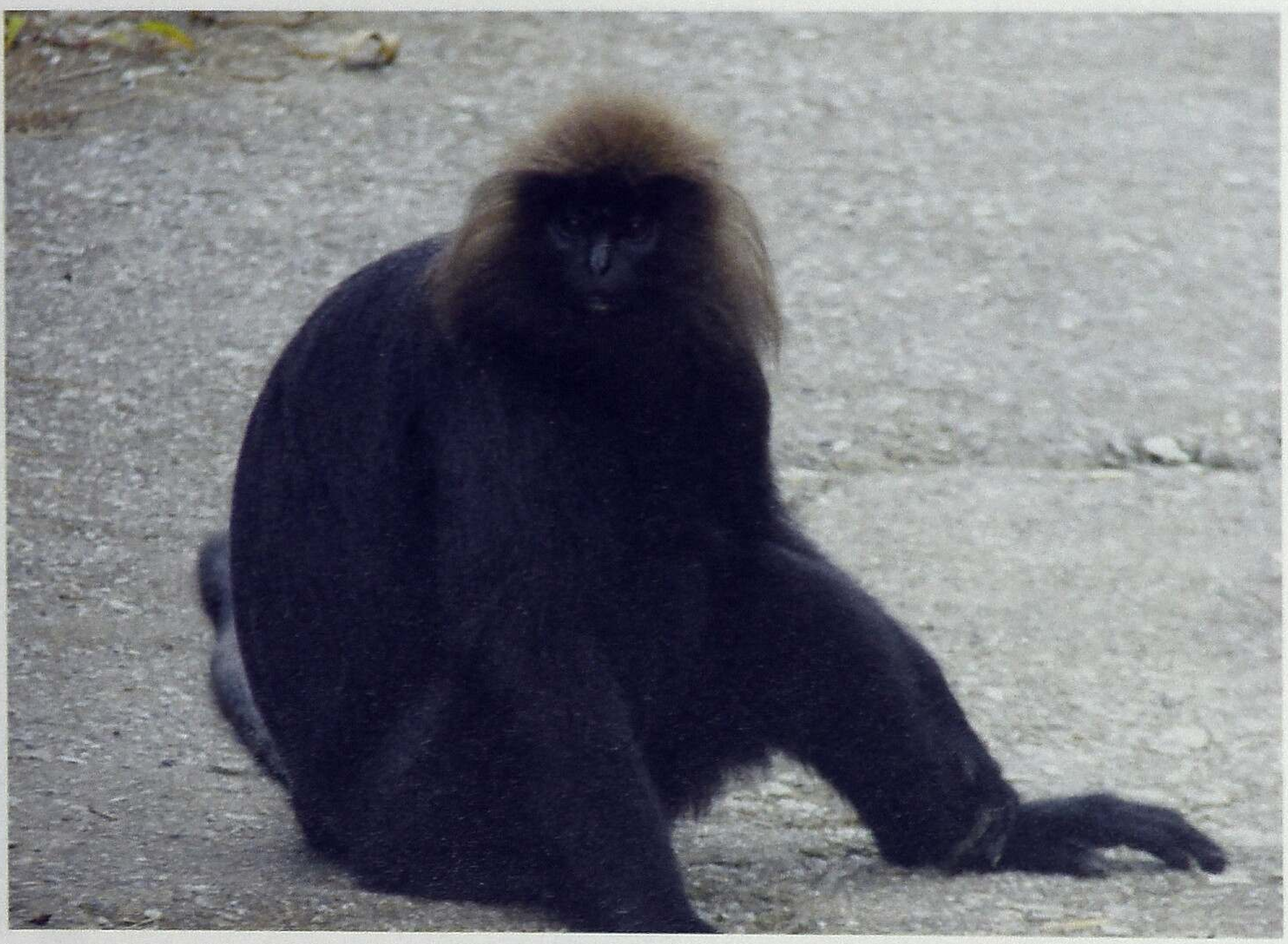
Nilgiri tahr in the grasslands at Mukurthi



Indian Gaur in the Mukurthi river

Shola Features

Elephant with calf at Mudumalai Wildlife Sanctuary



Nilgiri Langur at Pykara

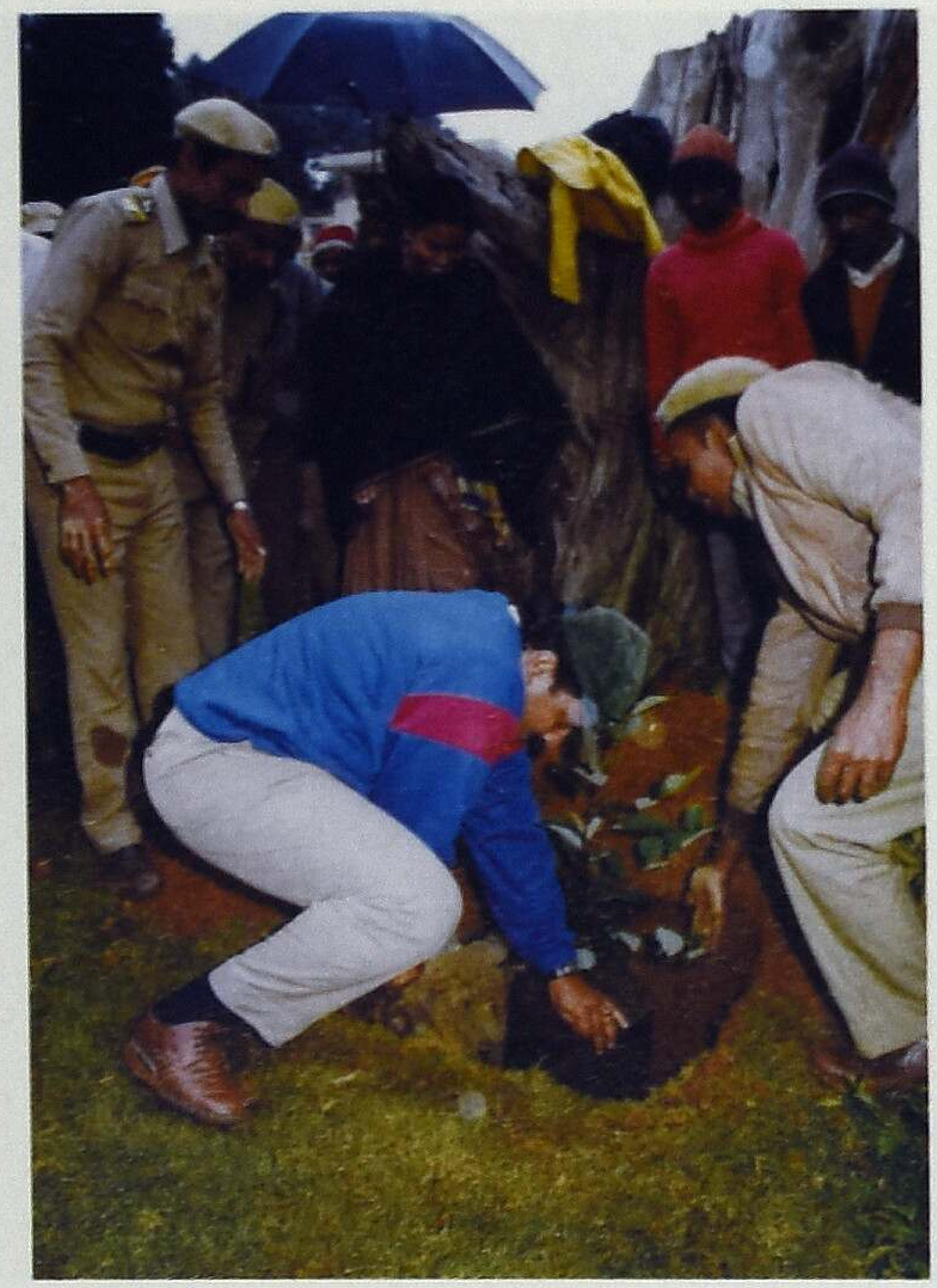
Shola Forest and Grassland Management

Barbed wire fencing of shola pocket by TNFD at Wenlock downs

Chain linked fencing of shola with stone angle maintained by TNFD

Shola Forest and Grassland Management

Seminar conducted by TNFD on shola forest restoration in Nilgiris during 1992



Shola restoration efforts by state forest department, Nilgiris

Shola Forest and Grassland Management

Seminar on ecological concerns and policy issues as relevant to Nilgiris conducted by TNFD and HADP during 1994

Shola Forest and Grassland Management

View of a typical Toda hut in Nilgiris

Awareness program of TNFD on shola conservation involving tribal women

Shola Forest and Grassland Management

Floristic exploration team at Longwood Shola

Floristic exploration team with forest staff at Kotagiri

SYSTEMATIC TREATMENT

KEYS TO CLASS, SUBCLASS AND FAMILIES

1. Leaves dorsiventral, reticulately veined; embryo with 2-cotyledons........................ ***Dicotyledons***
1. Leaves isobilateral with parallel veins (except in *Araceae*); embryo with 1-cotyledon .... ***Monocotyledons***

DICOTYLEDONS

1. Perianth uniseriate or absent .... ***Monochlamydeae***
1. Perianth 2 or more seriate **2**

2. Petals free .... ***Polypetalae***
2. Petals united .... ***Gamopetalae***

POLYPETALAE

1. Pistils 1 or more, free (apocarpous) **2**
1. Pistils syncarpous, 1 or more-celled **4**

2. Stamens on a (flat or concave) hypanthium .... ***Rosaceae***
2. Stamens inserted on a (convex) receptacle **3**

3. Plants herbaceous; perianth 1 or 2-seriate.. ***Ranunculaceae***
3. Plants woody; perianth 3 or more seriate... ***Magnoliaceae***

4. Plants aquatic; leaves peltate; flowers more than 10 cm wide.................. ***Nymphaeaceae***
4. Plants terrestrial; leaves not peltate; flowers less than 10 cm wide............................ **5**

5. Stamens variously connate at base **6**
5. Stamens free **8**

6. Anthers 1-celled; epicalyx usually present; staminal column adnate to petals ....***Malvaceae***
6. Anthers 2-celled; epicalyx absent; staminal column free from petals **7**

7. Leaves decussate .... ***Clusiaceae***
7. Leaves alternate; flowers unisexual; bracts prominent, persistent .... ***Theaceae***

8. Leaves lobed or compound, gland-dotted .... ***Rutaceae***
8. Leaves simple **9**

9. Anthers dehiscence poricidal; petals lacinate, cream .... ***Elaeocarpaceae***
9. Anthers dehiscence longitudinal; petals not lacinate... **10**

10. Stamens inserted on the calyx-tube; petals wringled; ovary 3-6-celled; ovules numerous .... ***Lythraceae***
10. Stamens not inserted on the calyx-tube **11**

11. Ovary 1-celled; ovules parietal..*Flacourtiaceae*
11. Ovary 2 or more celled; ovules axile.. **12**

12. Stamens twice as many as petals, or more.. **13**
12. Stamens as many as petals, or fewer.. **21**

13. Fruit a legume/ lomenum; placentation marginal (*Fabaceae*, *Caesalpiniaceae* & *Mimosaceae*)..*Fabaceae*
13. Fruit not a legume/ lomenum; placentation other than marginal (*Fabaceae*, *Caesalpiniaceae* & *Mimosaceae*).. **14**

14. Sepals more or less united at the base ....*Meliaceae*
14. Sepals usually free **15**

15. Petals and sepals 4; stamens 6 in 2 rows, free ....*Brassicaceae*
15. Petals 5, rarely 2-3; stamens never 6, perfect stamens as many as or twice to petals.............. **16**

16. Filaments and anthers more or less united; leaves simple, altenate.. **17**
16. Filaments and anthers free or if united at base; leaves compound or deeply lobed............... **18**

17. Flowers irregular; sepals 5, unequal; petals 3; stamens 8 or less; style single .... *Polygalaceae*
17. Flowers regular; sepals 3-4, equal; petals 4-5; stamens 5 or 10; styles 3-5 .... *Linaceae*

18. Leaves exstipulate; flowers zygomorphic; stamens 8 .... *Sapindaceae*
18. Leaves stipulate **19**

19. Trees or shrubs; leaves imparipinnate; fruit a berry .... *Staphyleaceae*
19. Annual herbs; leaves alternate, simple or compound; fruit 3-5 lobed capsule or berry **20**

20. Leaves simple; glands on torus 5; capsule beaked .... *Geraniaceae*
20. Leaves compound; glands on torus 6; capsule not beaked .... *Oxalidaceae*

21. Plants insectivorous, with glandular hairs .... *Droseraceae*
21. Plants not insectivorous, glandular hairs absent **22**

22. Flowers zygomorphic **23**
22. Flowers actinomorphic **25**

23. Trees; fertile stamens 2, on a cupular scale .... *Sabiaceae*
23. Herbs or subshrubs; fertile stamens 5, not on a cupular scale **24**

24. Ovary 1-celled; ovules parietal; dorsal sepal not spurred .... *Violaceae*
24. Ovary 5-celled; ovules axile; dorsal sepal spurred .... *Balsaminaceae*

25. Climbers **26**
25. Non-climbers **27**

26. Ovary 1-celled, sessile or on a gynophores; ovules numerous; parietal; corona present .... *Passifloraceae*

26. Ovary 2 or more celled, embedded in the disc; ovules 1 or 2 per cell, erect or pendulous .... *Vitaceae*

27. Leaves compound .... *Berberidaceae*

27. Leaves simple **28**

28. Flowers polygamo-dioecious or unisexual .... *Celastraceae*

28. Flowers bisexual **29**

29. Ovary 1 or 2-celled **30**

29. Ovary 3 or more celled **34**

30. Ovules 1 or 2, endulous or erect **31**

30. Ovules 3 or more **33**

31. Leaves decussate; petals cucullate, enclosing stamens.. *Rhamnaceae*

31. Leaves alternate; petals not cucullate, stamens free from petals.. **32**

32. Petals valvate; fruits 1-celled, 1-seeded .... *Icacinaceae*

32. Petals imbricate; fruits 3-5-celled, 1-seeded .... *Aquifoliaceae*

33. Trees or shrubs; ovules axile or parietal; capsule resinous .... *Pittosporaceae*

33. Herbs; leaves decussate; flowers cymose; ovules free-central or basal.............. *Caryophyllaceae*

34. Stamens more than 10 .... *Myrtaceae*

34. Stamens 10 or less **35**

35. Styles more than 1 .... **36**

35. Style 1 .... *Melastomataceae*

36. Plants aquatic or marshy.. **37**

36. Plants terrestrial; leaves all aternate.. **38**

37. Plants scapigerous; flowers bisexual, more than 1.5 cm wide, white..................... *Parnassiaceae*

37. Plants not scapigerous; flowers unisexual, less than 0.5 cm wide, creamy............. *Haloragaceae*

38. Herbs, shrubs or lianae.. **39**

38. Plants trees .... *Araliaceae*

39. Plants aromatic; inflorescence an umbel; fruit a cremocarp.. *Apiaceae*

39. Plants non-aromatic; inflorescence not an umbel; fruit not a cremocarp **40**

40. Leaves decussate; ovary 1-celled.. **41**

40. Leaves alternate; ovary more than 1-celled.. **42**

41. Plants xerophyte.. *Crassulaceae*
41. Plants other than xerophyte.. *Hypericaceae*

42. Plants dioecious; pistils apocarpous.. *Menispermaceae*
42. Plants monoecious; pistils gamocarpous... *Onagraceae*

GAMOPETALAE

1. Slender insectivorus herbs with bulbous traps.. *Lentibulariaceae*
1. Plants not insectivorus herbs and without bulbous traps..2

2. Ovary inferior or half inferior..3
2. Ovary superior...10

3. Inflorescence a capitulum; calyx modified into papus; fruit a achene.........................*Asteraceae*
3. Inflorescence other than a head; calyx regular; fruit other than achene...........................4

4. Leaves decussate, stipulate...5
4. Leaves alternate, exstipulate...7

5. Stipules intra or interpetiolar, conspicuous..*Rubiaceae*
5. Stipules lateral, inconspicuous or none..6

6. Trees or shrubs or climbers; fruit a 1-celled drupe or 2-3-celled berry..................*Caprifoliaceae*
6. Herbs; fruit dry, 1-celled drupe...*Valerianaceae*

7. Climbing plants with tendrils; stamens 3, anthers flexuose or induplicate.............*Cucurbitaceae*
7. Erect or scandent plants without tendrils; stamens 5 or more, anthers straight.....................8

8. Stamens 15 or more, filaments unequal; placenta pendulous...............................*Symplocaceae*
8. Stamens 5 or 10, filaments equal; placenta parietal..9

9. Shrubs; ovary 1-celled (Maesa) ....*Myrsinaceae* (p.p.)
9. Herbs; ovary 2-celled ....*Campanulaceae*

10. Herbs, scapose; if not scapose, nodes swollen 11
10. Plants non-scapose; leaves opposite or alternate 12

11. Inflorescence a panicle; corolla more than 1 cm wide, zygomorphic.....................*Gesneriaceae*
11. Inflorescence a spike; perianth less than 0.5 cm wide, actinomorphic..............*Plantagianaceae*

12. Leaves alternate...13
12. Leaves opposite..18

13. Stamens more than corolla-lobes; latex milky; ovule 1 per cell.............................. *Sapotaceae*
13. Stamens as many as, or less than, corolla-lobes.. 14

14. Stamens opposite to corolla-lobes; ovule 1 per cell, ovules many............................***Myrsinaceae***
14. Stamens alternate with corolla-lobes; ovary 2 or more celled..**15**

15. Ovary 3 or 4-celled...**16**
15. Ovary 2, rarely 5 or 6-celled; ovules 2; placentation axile...**17**

16. Climbers; corolla plicate..***Convolvulaceae***
16. Erect herbs; corolla not plicate...***Boraginaceae***

17. Fruit a berry; flowers actinomorphic; stamens 5 or more...***Solanaceae***
17. Fruit a capsule; flowers zygomorphic; stamens 4 or 2......................................***Scrophulariaceae***

18. Plants with milky latex; fruits follicles **19**
18. Plants without milky latex or watery; fruits other than follicles **20**

19. Pollinia and gynostegium present; pollen-masses not granular; filaments united, indistinct..***Asclepiadaceae***
19. Pollinia absent; gynostegium absent...***Apocynaceae***

20. Flowers actinomorphic; stamens equal..**21**
20. Flowers zygomorphic; stamens didynamous, usually with staminodes.................................**24**

21. Herbs; ovary 1-celled, ovules many **22**
21. Shrubs or trees; stamens alternate with corolla lobes **23**

22. Stamens opposite to corolla lobes; placenta free, central...***Primulaceae***
22. Stamens alternate with corolla lobes; placenta parietal...***Gentianaceae***

23. Stamens 2, alternate with carpels..***Oleaceae***
23. Stamens as many as with corolla lobes; trees or climbers; flowers solitary or in cymes...***Loganiaceae***

24. Stamens free...**25**
24. Stamens epipetalous..**27**

25. Herbs; ovary half-inferior; petals united only basally...***Lobeliaceae***
25. Shrubs or trees; ovary inferior or superior..**26**

26. Ovary inferior, 5-celled, or apparently or falsely 10 celled; fruit a berry.................***Vacciniaceae***
26. Ovary superior, 5-20 celled; fruit capsular...***Ericaceae***

27. Fruit a capsule; seeds more than 4; placenta axile or parietal...***Acanthaceae***
27. Fruit a drupe, pyrene or nutlet; seeds 4; placenta basal...**28**

28. Aromatic; calyx distinctly 2-lipped; ovary 4-lobed; style gynobasic except *Teucrium*; fruit of 4 nutlets..***Lamiaceae***
28. Non or scarcely aromatic; calyx not distinctly 2-lipped; ovary entire; style terminal; fruit a drupe or of pyrenes..***Verbenaceae***

MONOCHALAMYDEAE

1. Parasites **2**
1. Autophytes **3**

2. Perianth limb tubular, more than 2 cm long; anthers dehiscence longitudinal.......... ***Loranthaceae***
2. Perianth limb campanulate, less than 0.5 cm long; anthers dehiscence not longitudinal.......... ***Viscaceae***

3. Perianth absent.......... ***Piperaceae***
3. Perianth present; stamens as many as or more than perianth-lobes.......... **4**

4. Leaves compound; ovary 1-3 celled.......... ***Euphorbiaceae***
4. Leaves simple.......... **5**

5. Inflorescence a syconium .... ***Moraceae***
5. Inflorescence other than syconium **6**

6. Leaves opposite or whorled **7**
6. Leaves alternate **8**

7. Stamens epiphyllous .... ***Santalaceae***
7. Stamens free from perianth .... ***Lauraceae***

8. Flowers bisexual; stamens as many as or in multiples of perianth-lobes; perianth 1-seriate; pistil 1 .... **9**
8. Flowers unisexual; stamens as many as or in multiples of perianth-lobes; perianth 1-seriate; pistil 1.......... **13**

9. Stipules ochraceous .... ***Polygonaceae***
9. Stipules zero or inconspicuous **10**

10. Perianth scarious; stamens basally connate into a staminal sheath .... ***Amaranthaceae***
10. Perianth calycine; stamens free **11**

11. Peltate scales on tender parts; stamens epiphyllus .... ***Elaeagnaceae***
11. Peltate scales zero; stamens free from perianth **12**

12. Flowers 4-merous; stamens alternate with tepals; style lateral.......... ***Phytolacaceae***
12. Flowers 5-merous; stamens opposite with tepals; style terminal.......... ***Chenopodiaceae***

13. Perianth absent; inflorescence catkin-like.......... **14**
13. Perianth well-developed; inflorescence not a catkin-like.......... **15**

14. Ovary 1-celled; flowers in pendulous catkins.......... ***Salicaceae***
14. Ovary 2-6-celled; fruit cone-like, without involucre.......... ***Betulaceae***

15. Ovary 2 or 3-celled; ovules 1 or 2 per cell; stamens various, 2-10, free or variously connate.......... **16**

15. Ovary exclusively 1-celled; ovule 1 (3 in *Osyris*).......... **17**

16. Bracteoles decussately imbricate; leaves prominently 3-nerved.......... ***Buxaceae***

16. Bracteoles inconspicuous or zero; leaves penni-nerved.......... ***Daphniphyllaceae***

17. Ovary inferior; ovules 3, pendulous from a central column; anther-lobes unequal.......... ***Santalaceae***

17. Ovary superior; ovules 1, basal or pendulous; anther-lobes equal.......... **18**

18. Stamens more than perianth-lobes.......... ***Thymeleaceae***

18. Stamens as many as perianth-lobes; staminodes zero; anthers dehiscence longitudinally.......... **19**

19. Stamens inflexed in bud; anthers reversed; style simple; fruits achene.......... ***Urticaceae***

19. Stamens erect in bud; anthers not reversed; style bi-fid; fruits drupes or samara.......... ***Ulmaceae***

MONOCOTYLEDONS

1. Aquatic plants.......... **2**

1. Terrestrial or epiphytes.......... **4**

2. Pistils free .... ***Potomogetonaceae***

2. Pistils united **3**

3. Leaves sheathing at base; fruit dry and dehiscent; seeds ribbed .... ***Pontederiaceae***

3. Leaves not sheathing at base; fruit fleshy and indehiscent; seeds not ribbed.... ***Hydrocharitaceae***

4. Climbers or twiners .... ***Smilacaceae***

4. Terrestrial or epiphytes **5**

5. Inflorescence capitate **6**

5. Inflorescence not capitate **7**

6. Flowers bisexual; inner perianth yellow, lobes prominent, more than 4 mm wide; seeds many .... ***Xyridaceae***

6. Flowers unisexual; inner perianth creamish, lobes minute, less than 1 mm wide; seeds 2 or 3 .... ***Eriocaulaceae***

7. Leaves pinnately compound; drupe yellow .... ***Arecaceae***

7. Leaves simple; drupe not yellow **8**

8. Flowers irregular **9**

8. Flowers regular **11**

9. Median petal produced into a labellum; stamens and style united in to a column; fertile stamen 1, rarely 2 .... *Orchidaceae*

9. Median petal not produced into a labellum; stamens and style separate; fertile stamen 1 or 3.......... **10**

10. Leaves linear; veins parallel to leaf-margins; fertile stamens 3 .... *Iridaceae*

10. Leaves elliptic or ovate to obovate; veins perpendicular or oblique to leaf margins; fertile stamens 1; stamens and staminodes petaloid .... *Zingiberaceae*

11. Perianth zero or reduced to scales, bristles or lodicules **12**

11. Perianth well-differenciated **14**

12. Flowers in spikelets; fruit a caryopsis or nut **13**

12. Flowers in spadix; fruit a fleshy berry, 3-celled .... *Araceae*

13. Culm 3-quetrous, nodes zero; leaves with closed sheaths; flowers substended by a solitary bract .... *Cyperaceae*

13. Culm terete, nodose; leaves with open sheaths; flowers substended by two bracts (lemma and palea) .... *Poaceae*

14. Leaves septate; perianth lobes glumaceous; capsules prismatic .... *Juncaceae*

14. Leaves not septate; perianth lobes not glumaceous **15**

15. Outer whorl of perianth sepaloid, and inner petaloid .... *Commelinaceae*

15. All perianth petaloid **16**

16. Scapigerous herbs; leaves scaly; outer perianth-lobes winged .... *Burmanniaceae*

16. Non-Scapigerous herbs; leaves foliaceous; outer perianth-lobes not winged.......... **17**

17. Flowers umbellate; stamens inserted at the throat of perianth-tube; loculicidal capsule **18**

17. Flowers not umbellate; stamens not inserted at the base of perianth-tube; Fruit a capsule or berry.......... **19**

18. Inflorescence an umbel .... *Amaryllidaceae*

18. Inflorescence a raceme .... *Haemodoraceae*

19. Ovary inferior .... *Hypoxidaceae*

19. Ovary superior .... *Liliaceae*

ENUMERATION

1. ACANTHACEAE

1. Plants twiner .... *Thunbergia*
1. Plants herbs or shrubs 2

2. Fertile stamens 2 .... *Andrographis*
2. Fertile stamens 4 3

3. Anther cells with a white basal spur like appendage .... *Justicia*
3. Anther cells not appendaged at base 4

4. Ovules 3 or more in each cell .... *Barleria*
4. Ovules 2 or 1 in each cell 5

5. Plants scandent; inflorescence a raceme .... *Asystasia*
5. Plants erect; inflorescence spikes .... *Strobilanthes*

ANDROGRAPHIS Wall. ex Nees

1. Prostrate or spreading herbs.. *A. lobelioides*
1. Erect herbs or subshrubs.. 2

2. Herbs, anthers bearded at the base .... *A. lineata*
2. Subshrubs, anthers not beared at the base .... *A. alata*

1. Andrographis alata (Vahl) Nees in DC., Prodr. 11: 516. 1847; Hook. f., Fl. Brit. India 4: 502. 1884; Gamble, Fl. Pres. Madras 1049 (735). 1925; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 138. 1987. *Justicia alata* Vahl, Enum. Pl. 1: 139. 1804. **(PLATE 1: 1)**

Local names: Vallikiriyathu (M); Periya-nangai (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shady areas in grasslands.

Slender subshrubs. Leaves opposite, to 7 x 3 cm, elliptic-obovate, gradually acute, puberulous above; petiole to 0.5 cm. Panicles axillary and terminal, to 10 cm. Flowers ca. 1 cm apart, subsessile; pedicel 0.3 cm; bracts lanceolate, 0.3 cm, acute; bracteoles 2. Calyx-lobes 5, to 4 mm, glandular-hairy, acute. Corolla white with purple lines, eglandular without, 10 x 0.2 cm across; tube 6 mm, puberulous within the throat below; upper lip 7 mm; lower lip 8 mm, free. Stamens 2. Capsule oblong, 1.5 x 0.3 cm, acute, glandular-hairy. Seeds ovoid, 1.5 mm across.

Flowering & Fruiting: October - December.

Notes: Found in shade, shola floor ± 2100 m, common in Sispara.

PSU & NKK, Wenlockdowns, 27.01.1991, II d 18 (Cairn Hills).

2. **Andrographis lineata** Wall. ex Nees in Wall., Pl. Asiat. Rar. 3: 116. 1832; Hook. f., Fl. Brit. India 4: 504. 1884; Gamble, Fl. Pres. Madras 1049 (735). 1924; Fyson, Fl. South Indian Hill. St. 2: t. 456.1932; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 139. 1987. **(PLATE 1: 2)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Stout erect herbs. Leaves oblong-lanceate, to 7 x 1.3 cm, base rounded or obtuse, margin stiff ciliolate, apex acute, hispid, thick-chartaceous; petiole absent or very short. Flowers dense in terminal panicles, glandular hirsute. Calyx-lobes lanceate. Corolla pale purple, slightly ventricose. Stamens 2. Capsule oblong-cylindric. Seeds small.

Flowering & Fruiting: September - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Korakundha.

PSU & NKK, Upper Bhavani, 18.02.1991, I c 52 (Cairn Hills).

3. **Andrographis lobelioides** Wight, Ill. 2: t. 164 b.f. 11. 1850, var. **lobelioides**; Clarke in Hook. f., Fl. Brit. India 4: 505. 1884; Gamble, Fl. Pres. Madras 1050 (736). 1924; Fyson, Fl. South Indian Hill. St. Ill. 2: t. 210. 1932; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 139. 1987. **(PLATE 1: 3)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grass lands.

Perennial spreading herbs with thick rootstocks; stems weak, many, 15-30 cm, trichotomously branched, pubescent, with longer gland-tipped hairs. Leaves ovate-acute, to 2 x 0.8 cm, subsessile, covered on the upper sides, margins and nerves of the underside with gland-tipped hairs. Flowers in racemes or panicles, terminal, often one-sided though the bracts are in opposite pairs. Calyx equal to corolla. Corolla about 1.5 cm long; limb equal to the tube; upper lip 3-fid, pinkish; lower two-lobed, purplish brown. Anthers well exserted, white with stiff hairs. Capsule oblong-cylindric. Seeds small.

Flowering & Fruiting: August - March.

Notes: Found in the ecotone region of grasslands ± 2050 m, common in Shooting Point.

PSU & NKK, Naduvattam, 13.02.1991, I c 53 (Cairn Hills).

ASYSTASIA Bl.

4. **Asystasia crispata** Benth., Linnaea 24: 647. 1852; Hook. f., Fl. Brit. India 4: 494. 1884; Gamble, Fl. Pres. Madras 1063 (745).1924; Fyson, Fl. South Indian Hill. St. Supp. 3: t. 455.1932; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 141. 1987. **(PLATE 1: 4)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Under shrubs. Leaves opposite, 6-9 x 3-5 cm, elliptic-ovate, apex shortly acuminate, base rounded to broadly acute, margin crenulate or crispate, thinly scabrous or puberulous along nerves. Racemes terminal, usually paired, to 8 cm; lower flowers 0.5 cm apart, subsessile; bracts lanceolate, 2 cm. Calyx-lobes 5, lanceolate, 6 x 1 mm, thinly pubescent, acute. Corolla purple, violet to pink, 3 cm across; tube 2 cm, sparsely hairy without; lobes 5, ca. 1 cm. Stamens 2. Capsule 1.5 x 0.6 cm, pubescent, beak 1.5 cm. Seeds angular, 0.6 cm across.

Flowering & Fruiting: November - January.

Notes: Found in the watercourses region of shola border ± 1800 m, common in Gethai.

PSU & NKK, Thaishola, 17.02.1991, II c 56 (Cairn Hills); KNS, Longwood, 08.05.1963, 461 (FRC).

BARLERIA L.

5. **Barleria involucrata** Nees var. **elata** (Dalz.) Clarke in Hook. f., Fl. Brit. India 4: 486. 1884; Fyson, Fl. South Indian Hill. St. Supp. 3: t. 454.1932; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 142. 1987. *Barleria elata* Dalz. in Hook.'s J. Bot. Kew. Gard. Misc. 3: 227. 1851. **(PLATE 1: 5)**

Common name: Neelakuringi (M).

Distribution: Endemic to Peninsular India. *Habitat*: Evergreen to Shola margins.

Subshrubs, branchlets quadrangular, tawny pubescent. Leaves 10-15 x 4-6 cm, elliptic, acuminate at both ends, thinly pubescent above. Cymes densely pubescent; bracts

linear to oblanceolate. Flowers many, outer sepals 3-3.5 x 1-1.3 cm, oblong-lanceolate, acute, densely tawny pubescent, one shortly bifid at apex, inner sepals 15 x 3 mm, lanceolate, pubescent. Corolla 7-8 cm long, tube 4-6 cm long, cylindrical, thinly hairy out, lobes spreading, blue. Filaments villous at base.

Flowering & Fruiting: February - November.

Notes: Found in the ecotone of shola floor ± 2100 m, common in Sispara.

JUSTICIA L.

1. Flowers pink, subsessile, in dense linear cylindric spikes .... *J. japonica*
1. Flowers white with purple lines, in long spikes .... *J. nilgherrensis*

6. Justicia japonica Thunb., Fl. Jap. 20. 1784. *Rostellularia japonica* (Thunb.) Ellis, Bull. Bot. Surv. India 22: 196. 1980 (1982); G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 158. 1987. *Justicia simplex* D. Don, Prodr. Fl. Nepal. 118. 1825; Hook. f., Fl. Brit. India 4: 539. 1885; Gamble, Fl. Pres. Madras 1080 (756). 1924; Fyson, Fl. South Indian Hill. St. 2: t. 212.1932. *Rostellularia mollissima* (Nees) Nees in DC., Prodr. 11: 373. 1847. **(PLATE 1: 6)**

Distribution: Indo-Malesia and East Africa. *Habitat*: Grassslands.

Erect or decumbent herbs, branchlets strigose-hispid. Leaves to 2 x 1.5 cm, ovate or linear, apex acute, sparsely scabrous above and strigose below. Flowers subsessile, in dense linear cylindric spikes 4-8 cm; bracts and bracteoles ovate, scarious, softly hairy, 4 mm long. Calyx lobes linear, margins scarious, ciliate, 4 mm long. Corolla 2-lipped, 4 mm long, pink. Stamens 2, subexcerted. Ovary 2-locular; locules 2-ovuled. Capsule pubescent, 4 mm long.

Flowering & Fruiting: August - February.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2230 m, common in Pykara.

PSU & NKK, Kodanad, 11.03.1994, 188 & 05.10.1994, 235 (TNFDH); KNS, Dodabetta, 08.02.1984, 40 (FRC).

7. Justicia nilgherrensis (Nees) Wall. ex Anders., J. Linn. Soc. Bot. 7: 118.1863; Gamble, Fl. Pres. Madras 1078 (755). 1924; Fyson, Fl. South Indian Hill. St. 2: t. 211. 1932; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 150. 1987. *Adhatoda nilgherrensis* Nees in Wall., Pl. Asiat. Rar. 3: 103. 1832. **(PLATE 1: 7)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Herbs with woody thick rootstock and long roots. Stem often numerous, procumbent. Leaves opposite, 3-3.5 x 0.5-1 cm, sessile, oblong-lanceolate, obtuse, soft, greyish green in colour, glabrous, minutely punctuate, finely ciliate along the margin. Flowers white with purple lines, in 4-10 cm long spikes; bracts 1.5 x 0.7 cm, ovate, very acute, white but with large green nerves; bracteoles nearly as large. Calyx lobes five, 5 mm long, all equal, linear acute, jointed only near the base. Corolla tube slightly longer, broadening suddenly above the base: upper lip 8 mm long, very concave, notched; lower lip 1 cm broad, 3-fid; lobes spreading; middle lobe rounded, slightly broader than the laterals. Capsule 2 cm long, dark purple above, velvety tomentose, laterally contracted at the base. Seeds 4 mm across, papillate.

Flowering & Fruiting: February- May.

Notes: Found in the ecotone region of sholas ± 2230 m, common in Pykara.

STROBILANTHES Bl.

1. Stamens 2 .... **2**
1. Stamens 4 .... **5**

2. Seeds glabrous, exareolate; cylinder base of corolla suddenly widening.......... ***S. foliosus***
2. Seeds densely hairy, areolate; cylinder base of corolla gradually widening.......... **3**

3. Flowers in broad spikes; bracts large, broad, ovate or ovate-elliptic .... ***S. kunthianus***
3. Flowers in narrow spikes, slender; bracts small, narrow, ovate or ovate-elliptic or not **4**

4. Spikes glandular-hispid in flower, not woolly, more or less interrupted .... ***S. cuspidatus***
4. Spikes never glandular-hispid in flower, with grey or tawny wool, interrupted or not .... ***S. lanatus***

5. Inflorescence short spikes or heads **6**
5. Inflorescence panicles **10**

6. Capsules 2-seeded .... ***S. papillosus***
6. Capsules 4-seeded **7**

7. Spikes scandent; corolla deep purple, distinctive .... ***S. micranthus***
7. Spikes not scandent; corolla not deep purple, distinctive **8**

8. Bracts glandular pubescent .... ***S. wightianus***
8. Bracts not glandular pubescent **9**

9. Bracts oblong or elliptic-obovate .... ***S. neilgherrensis***
9. Bracts ovate or orbicular .... ***S. pulneyensis***

10. Panicles thick, flexuose .... *S. homotropus*
10. Panicles slender 11

11. Capsules 2-seeded .... *S. gracilis*
11. Capsules 4-seeded 12

12. Spikes erect, oblong .... *S. zenkerianus*
12. Spikes deflexed, oblong or clavate, usually glabrous 13

13. Bracts orbicular caudate; stems quadrangular, often winged; leaves elliptic-lanceolate; stamina sheath extending to half of ventricose portion .... *S. barbatus*
13. Bracts not orbicular caudate 14

14. Seed hairy when wet 15
14. Seeds glabrous 16

15. Plants rhizomatous; sessile; calyx lobes densely hairy inside at base; corolla tubular-ventricose .... *S. sessilis*
15. Plants not rhizomatous; calyx lobes not hairy inside at base .... *S. neoasper*

16. Inflorescense on old stems; bracts orbicular, entire or wavy, stamens equal, excerted; seeds lenticular,glabrous .... *S. luridus*

16. Inflorescense not on old stems; bracts elliptic-obtuse; stamens united in pairs and with 'V' shaped staminal sheath, included; seeds complanate .... *S. heyneanus*

8. Strobilanthes barbatus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Hook. f., Fl. Brit. India 4: 437. 1884; Gamble, Fl. Pres. Madras 1037 (727). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 66. 2006. *Nilgirianthus barbatus* (Nees) Bremek., Mat. Monogr. Strob. 172. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 153. 1987. *Strobilanthes barbatus* Nees var. *bonaccordensis* Santhosh & Raj Vikraman, Journ. Econ. Tax. Bot. 25: 742. 2001.
(PLATE 1: 8)

Common names: Kurinji (T).

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Gregarious shrubs, 3-4 m high, sometimes subscandent; stems quadrangular, often winged, sulcate, glabrous. Leaves opposite in unequal pairs, to 15 x 8 cm, elliptic-lanceolate, decurrent at base, entire, crenulate or repand at margin, acute at apex, coriaceous, glabrous, rarely puberulous, lineolate above; petioles winged, ca 5 cm long, often swollen at leaf base. Spikes, to 5 cm long, sometimes subsessile 2-4-fascicled heads interrupted at base, dense-flowered; bract imbricate, orbicular, caudate at apex,

grooved in adaxial face, recurved; bracteoles ovate-lanceolate, ca 1.5 cm long, pubescent, ciliate. Calyx to 1.2 cm long; lobes subequal, linear-lanceolate, minutely ciliate or not. Corolla tubular-campanulate, to 2.5 cm long, glabrous outside, hairy inside, white. Stamens 4, included or slightly exserted, didynamous; staminode absent. Capsules elliptic, to 1.2 cm long. Seeds 2, obovate-orbicular, subacute at apex, ca 6 mm across.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas ± 2300 m, common in Ankinda; flowering about every seventh year.

9. **Strobilanthes cuspidatus** (Benth.) Anders., J. Linn. Soc. Bot. 9: 465. 1867; Hook. f., Fl. Brit. India 4: 435. 1884; Gamble, Fl. Pres. Madras 1036 (726). 1924; Fyson, Fl. South Indian Hill. St. 1: 207. 1932; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 89. 2006. *Endopogon cuspidatus* Benth., Linnaea 24: 646. 1851. *Endopogon versicolor* Wight, Ic. t. 1497. 1849. *Phlebophyllum versicolor* (Wight) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41:170.1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 157. 1987. **(PLATE 1: 9)**

Common names: Kannarakurinji (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Large shrubs; stems terete; branchlets adpressed-white woolly. Leaves to 15 x 6 cm, ovate, acuminate, entire, base acute, glabrous. Spikes 3-5 cm long, interrupted, on trichotomously branched peduncle; bracts 2-4, 2 x 0.5 cm, lanceolate, glandular-hairy. Flowers few. Calyx 7 mm long, lobes subulate, glandular-hairy. Corolla 2.5 cm long, blue. Capsule 1.5 cm long, stalked, glabrous. Seeds orbicular, hairy.

Flowering & Fruiting: December - February.

Notes: Found in the ecotone region of sholas ± 1600 m, common in Kunjapanai; flowering about every seventh year.

PSU & NKK, Kodanad, 17.06.1994, 66 (TNFDH).

10. **Strobilanthes foliosus** (Wight) Anders., J. Linn. Soc. Bot. 9: 467. 1867; Hook. f., Fl. Brit. India 4: 433. 1884; Gamble, Fl. Pres. Madras 1035 (726). 1924; Fyson, Fl. South Indian Hill. St. 1: 451.1932; Venu in Daniel & Sanjappa

(eds.), Fl. India ser. 4, Strobilanthes 99. 2006. *Endopogon foliosus* Wight, Ic. t. 1501. 1849. *Endopogon capitatus* Wight, Ic. t. 1499. 1849. *Nilgirianthus foliosus* (Wight) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 173. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 154. 1987. **(PLATE 2: 10)**

Common names: Kallukurinji, Vettilakurinji (M).

Distribution: Peninsular India. *Habitat*: Rocky areas of shola forests.

Shrubs; branchlets terete, glabrous, stout, reddish. Leaves 4-7 x 1.5-3 cm, elliptic, acute at either ends, coriaceous, serrate, whitish below. Spikes 3-4 cm long, lanceolate, axillary and terminal; basal bracts 4, in two opposite pairs, 3 x 1 cm; floral bracts 2 x 0.6 cm, lanceolate, glabrous; bracteoles 17 x 3 mm, linear. Flowers few. Calyx 1.7 cm long, lanceolate, glabrous. Corolla 4.5 mm long, glabrous, blue, tube cylindrical at lower part. Filaments united, hairy. Capsule 1.5 cm long. Seeds 8 x 7 mm, yellowish, glabrous.

Flowering & Fruiting: October - December.

Notes: Found in the shola border ± 2000 m, common in Kodanad. It is often found in flower every year.

11. Strobilanthes gracilis Bedd., Ic. t. 207. 1868-1874; Hook. f., Fl. Brit. India 4: 474. 1884; Gamble, Fl. Pres. Madras 1043 (731). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 103. 2006. *Mackenziea gracilis* (Bedd.) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41:182.1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 153. 1987. **(PLATE 2: 11)**

Common names: Thokakurinji (M).

Distribution: Peninsular India. *Habitat*: Shola undergrowth.

Thick shrubs; stems obtusely quadrangular, glabrous. Leaves 12-15 x 4-6 cm, elliptic, decurrent and auricled at base, acuminate at apex, serrate. Spikes panicled, terminal and upper axillary; bracts 7 x 2 mm, oblanceolate, glandular hairy. Flowers 1-3. Sepals 9 x 1.5 mm, tube 1 mm long, lobes oblanceolate. Corolla 3.0 cm long; tube narrow below, ventricose above, hairy. Capsule 14 x 7 mm, elliptic, compressed. Seeds 3.5 x 3 mm, orbicular, flat.

Flowering & Fruiting: April - June.

Notes: Found in dense undergrowth in sholas ± 2300 m, common in Ankinda.

12. Strobilanthes heyneanus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Hook. f., Fl. Brit. India 4: 443. 1884; Gamble, Fl. Pres. Madras 1041 (730). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 109. 2006. *Nilgirianthus heyneanus* (Nees) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 173. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 154. 1987. *Nilgirianthus heyneanus* (Nees) Bremek. var. *neesii* Bremek., Mat. Monogr. Strob. 173. 1944. *Strobilanthes asperrimus* Nees in DC., Prodr. 11: 183. 1847; Hook. f., Fl. Brit. India 4: 443; 1884; Gamble, Fl. Pres. Madras 1041 (730). 1924. **(PLATE 2: 12)**

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Shrubs, branches hirsute. Leaves 6-10 x 4-7 cm, broadly elliptic, apex bluntly acuminate, base attenuate, crenate, covered with bulbous based hairs. Spikes 3-4 together, 2 x 1.5 cm, axillary, on trichotomous peduncles, ovoid; involucral bracts 8 x 6 mm, broadly ovate, obtuse; floral bracts 13 x 10 mm, ovate, concave, obtuse, glabrous; bracteoles absent. Flowers few to many. Sepals 6 x 2.5 mm, oblong, emarginate, connate a little above the base. Corolla blue, 2.5 cm long; tube stout, with a patch of hairs inside above the stamens; staminal filaments and sheath hairy. Capsule 9 x 4 mm, glabrous. Seeds winged.

Flowering & Fruiting: October - December.

Utility: Used in Ayurveda.

Notes: Found in the Margins of shola forests and grasslands ± 2300 m, common in Ankinda.

PSU & NKK, Gethai, 10.03.1991, L b 61 (Cairn Hills).

13. Strobilanthes homotropus Nees in DC., Prodr. 11:187.1847; Hook. f., Fl. Brit. India 4:474.1884; Gamble, Fl. Pres. Madras 1043 (731). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 114. 2006. *Mackenziea homotropa* (Nees) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 182. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 153. 1987. *Strobilanthes sexennis* sensu Bedd., Ic. t. 206. 1868-1874, non Nees 1847; Fyson, Fl. South Indian Hill St. 1: 314. 1932. **(PLATE 2: 13)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Large shrubs; young branches glandular-hairy. Leaves 15-25 x 4-10 cm, elliptic, acuminate at apex, attenuate and auricled at base. Spikes 1-3 flowered, in terminal panicles, hirtus, tomentose; bracts 10-15 mm long, leafy; bracteoles 10 x 2 mm, spathulate, glandular-hairy. Sepals 13 x 2 mm, spathulate, hairy. Corolla 2.8 cm long, pale blue. Staminal filaments hairy. Capsule 14 x 7 mm, glabrous. Seeds 5 x 4 mm, compressed.

Flowering & Fruiting: October - December.

Notes: Found in the ecotone region of sholas ± 2400 m, common in Dodabetta.

14. Strobilanthes kunthianus (Nees) Anders. ex. Benth., Fl. Hong. 262. 1861; Hook. f., Fl. Brit. India 4: 434. 1884; Gamble, Fl. Pres. Madras 1036 (726). 1924; Fyson, Fl. South Indian Hill. St. 2: t. 206. 1932; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 129. 2006. *Phlebophyllum kunthianum* Nees in Wall., Pl. Asiat. Rar. 3: 83. 1832; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 156.1987. **(PLATE 2: 14)**

Common names: Neelakurinji (M); Kurunji-poo, Neelakurinji (T).

Distribution: Peninsular India. *Habitat*: Shola border.

Profusely branched shrubs; branchlets 4-angular, rigid. Leaves elliptic-lanceolate to obovate, 5 x 3 cm, coriaceous, scabrid above, pubescent below, acuminate at apex, margin crenate-serrate, rounded at base; petioles about 1 cm long. Spikes terminal or in upper axils, interrupted, sometimes branched, subtended by 2 upper pairs of leaves; bracts ovate-acuminate, ca 1 cm across, closely imbricated in 4 rows; bracteoles linear-ligulate. Flowers many. Calyx villous, 10 mm long, lobes 5, linear-lanceolate. Corolla 2.5 cm long, pale blue or mauve, ventricose above, hairy within; lobes 5, rounded. Stamens 2. Ovary globose, 2-locular; locules 2-ovuled. Capsules oblong-ellipsoid, about 1.5 cm long. Seeds 4, hairy.

Flowering & Fruiting: September - January.

Notes: Found in gregarious, on bare slopes, ravines, open grasslands etc. ± 2000 m, common in Kodanad. Flowering about every 12th year.

PSU & NKK, Kalhatty, 27.03.1991, 64 (TNFDH); KNS, Kokuthurai RF, 12.05.1963, 739 (FRC).

15. Strobilanthes lanatus Nees in DC., Prodr. 11: 191. 1847; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 132. 2006. *Strobilanthes gossypinus*

Anders., J. Linn. Soc. Bot. 9: 466. 1867; Hook.f., Fl. Brit. India 4: 434. 1884; Gamble, Fl. Pres. Madras 1037 (727). 1924. *Phlebophyllum lanatum* (Nees) Bremek. in Verh. Kon. Ned. Acad. Wetensch., afd. Natuurk., Tweede sect. 41: 169. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 156.1987. **(PLATE 2: 15)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Hill slopes.

Erect shrubs; stems tetragonous, densely cottony-tomentose. Leaves to 12 x 5 cm, broadly elliptic-ovate, acute or rounded at base, entire at margin, acute or acuminate with a twisted point at apex, coriaceous, glabrous above, soft spreading floccose tawny woolly beneath. Inflorescence spikes, axillary or terminal, usually single, rarely branched, uninterrupted, 4-8 cm long, with grey or tawny wool; bracts ovate or lanceolate, acute, white-yellow-tomentose outside, glabrous and shining inside; bracteoles linear-oblong, yellow-tomentose outside, glabrous inside. Calyx ca 1.2 cm long; lobes linear, equal, pubescent outside, glabrous and shining dark violet inside. Corolla infundibuliform, to 3.5 cm long, pale blue; tube faintly curved, gradually widening above, 5-lobed; lobes orbicular, acute. Stamens 2; filaments ca 1.5 cm long, included, very hairy. Capsules not reported.

Flowering & Fruiting: November - April.

Notes: Found in the ecotone region of sholas, dry hill slopes ± 2300 m, common in Ankinda; periodicity of flowering in every 7th year.

PSU & NKK, Thaishola, 19.02.1991, c 66 (Cairn Hills).

16. Strobilanthes luridus Wight, Ic. t. 1515, 1516. 1850; Hook. f., Fl. Brit. India 4: 450. 1884; Gamble, Fl. Pres. Madras 1042 (730). 1924; Fyson, Fl. South Indian Hill St. 3: t. 453. 1920; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 140. 2006. *Didyplosandra lurida* (Wight) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 178. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 144.1987. **(PLATE 2: 16)**

Common names: Muttakannikurinji (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Large straggling branched shrubs; stem thick, virgate, swollen at nodes, glabrous. Leaves to 20 x 10 cm, ovate-elliptic, obtuse towards base, crenulate at margin, acuminate at apex, coriaceous, pilose, densely so beneath. Inflorescences in spikes,

from older stems, often from near ground, opposite, ascending, uninterrupted, compact, ca 8 x 4.5 cm, hispid; bracts orbicular, large, ca 2.5 x 2 cm, entire or wavy at margin, acute, emarginated or retuse at tip, ribbed, glabrous or glandular-pubescent, purple with black tinge; bracteoles 2, ligulate, ca 1.8 cm, acute, white. Calyx ca 2 cm long, 5-lobed, near to the base; lobes lanceolate, slightly enlarged in fruit with a row of bristles on abaxial face, finely ridged. Corolla somewhat bilabiate, ca 3 cm long, exceeding large dull bracts, tubular-ventricose, purple, attractive; tube ventricose portion widening above gradually, glabrous outside, hairy inside, 5-lobed; lobes ovate, obtuse. Stamens 4, equal, united in pairs at base forming a staminal sheath, glabrous. Capsules ovoid-ellipsoid, ca 2 cm long, acuminate, glabrous, included in bracts. Seeds 4, rounded, lenticular, ca 7 mm, smooth, glabrous on both faces, exareolate.

Flowering & Fruiting: December - April.

Notes: Found in dense undergrowth of sholas ± 1950 m, common in Longwood.

17. Strobilanthes micranthus Wight, Ic. t. 1519. 1850; Hook. f., Fl. Brit. India 4: 444. 1884; Gamble, Fl. Pres. Madras 1040 (729). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 147. 2006. *Taeniandra micrantha* (Wight) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 175. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 161.1987. **(PLATE 2: 17)**

Common names: Kallankurinji (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola floor.

Large shrubs; branchlets quadrangular, glabrous. Leaves to 18 x 9 cm, elliptic, acuminate at both ends, crenulate, glabrous, pubescent below. Spikes 5-10 cm long, ovoid to oblong, solitary, axillary, enlarging in fruit; bracts 2.7 x 1.2 cm, lanceolate, hirtus, with an oval depression towards the base inside; bracteoles hairy. Calyx 1.7 cm long, lobes acuminate. Corolla 1.8 cm long, campanulate with deflexed lobes; reddish brown. Staminal filaments glabrous. Capsules ovoid-ellipsoid. Seeds 6 x 4 mm, oblong.

Flowering & Fruiting: November - April.

Notes: Found in dense undergrowth of sholas ± 2100 m, common in Sispara.

18. Strobilanthes neilgherrensis Bedd., Ic. t. 196. 1868-1874; Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1038 (728). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 152. 2006. *Nilgirianthus*

neilgherrensis (Bedd.) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 174. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 155.1987. **(PLATE 2: 18)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs; stems more or less quandrangular, much scabrous, acutely so and very rough with short hairs when young. Leaves opposite, ca 6 x 4 cm, ovate, cuneate or acute at base, serrate at margin, acute at apex, hispid with bulbous- based hairs on both surfaces. Inflorescence in spikes, terminal and axillary, capitate, leafy, ca 5 cm long; floral bracts ca 5 cm long, overlapping head; bracts leafy, lanceolate, very rigid, scabrous, papillose; bracteoles narrowly lanceolate, ca 2 cm long, membranous, ciliate. Calyx divided nearly to base; lobes linear-lanceolate, very acute, ca 2.5 cm, membranous, ciliate. Corolla tubular-ventricose, subsymmetric, glabrescent, blue; tube ca 2 mm long; ventricose portion ca 2.3 cm long; lobes obovate-orbicular or rounded, veined. Stamens 4; staminal sheath hairy at margin; filaments glabrous; two central ones shorter, included. Capsules ca 2.5 cm long, glabrous, minutely stalked. Seeds 2, ovoid, ca 1.2 cm across, glabrous, exareolate.

Flowering & Fruiting: May - November.

Notes: Found in the ecotone region of sholas ± 2310 m, common in Ankinda.

19. Strobilanthes neoasper Venu & Daniel in Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 154. 2006. *Strobilanthes asper* sensu Wight, Ic. t. 1518. 1850, non Decne. 1834; Hook. f., Fl. Brit. India 4: 452. 1884; Gamble, Fl. Pres. Madras 1041 (730). 1924; Fyson, Fl. South Indian Hill. St. Supp. 3: 94.1920. *Nilgirianthus asper* (Wight) Sant., Bot. Mem. Univ. Bombay 2: 42. 1951; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 153.1987. *Strobilanthes warreensis* auct. non Bremek. 1944. **(PLATE 3: 19)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Shrubs; stems quadrangular. Leaves, ca 12 x 7 cm, variable, mostly elliptic-ovate, cuneate and decurrent at base, crenate-crenulate at margin, acuminate at apex, membranous, hirsute, lineolate on both surfaces. Inflorescence panicles with compact spikes; spikes ovate, 2.5-5 cm long in flower, 5-8 cm long in fruit; bracts elliptic-ovate or elliptic-lanceolate, ca 1.3 cm long, decurrent at base, curled or flat at margin, obtuse or acute at apex, glandular-hairy; bracteoles linear, obtuse or acute, ca 1 cm long, ciliate, glandular-hairy. Calyx ca 1 cm long, lobed almost to base; tube ca 1 mm

long; lobes 5, linear-lanceolate, equal, densely glandular-hairy in upper half, thinly so or glabrous in the lower. Corolla tubular-ventricose, ca 1.5 cm long, pale lilac; cylinder base shorter, ca 3 mm long; limb campanulate, ventricose, ca 1.2 cm long, hairy, 5-lobed; lobes triangular, obtuse. Stamens 4, included, didynamous. Capsules elliptic, ca 1 cm long, acute at apex. Seeds 4, orbicular-obovate, ca 3 mm across, complanate, elastically hairy when wet, areole round, prominent, glabrous.

Flowering & Fruiting: January - April.

Notes: Found in the ecotone region of sholas ±1820 m, common in Naduvattam.

PSU & NKK, Kodanad, 30.03.1994, 31 (TNFDH).

20. Strobilanthes papillosus Anders., J. Linn. Soc. Bot. 9: 468. 1867; Hook. f., Fl. Brit. India 4: 445. 1884; Gamble, Fl. Pres. Madras 1039 (728). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 159. 2006. *Nilgirianthus papillosus* (T. And.) Bremek., Verh. Kon. Ned. Acad. Wet. afd. Natuurk. Sect. 2, 41: 173. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 155.1987. **(PLATE 3: 20)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs; stems more or less quandrangular, much scabrous, acutely so and very rough with short hairs when young. Leaves opposite, ca 6 x 4 cm, ovate, cuneate or acute at base, serrate at margin, acute at apex, hispid with bulbous-based hairs on both surfaces. Inflorescence spikes, terminal and axillary, capitate, leafy, ca 5 cm long; floral bracts ca 5 cm long, overlapping head; bracts leafy, lanceolate, very rigid, scabrous, papillose; bracteoles narrowly lanceolate, ca 2 cm long, membranous, ciliate. Calyx divided nearly to base; lobes linear-lanceolate, very acute, ca 2.5 cm, membranous, ciliate. Corolla tubular-ventricose, subsymmetric, glabrescent, blue; tube ca 2 mm long; lobes obovate-orbicular or rounded, veined. Stamens 4; staminal sheath hairy at margin; filaments glabrous; two central ones shorter, included. Capsules ca 2.5 cm long, glabrous, minutely stalked. Seeds 2, ovoid, ca 1.2 cm across, glabrous, exareolate.

Flowering & Fruiting: October - November.

Notes: Found in the ecotone region of sholas ± 2300 m, common in Ankinda.

21. Strobilanthes pulneyensis Hook.f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1038 (727). 1924; Fyson, Fl. South Indian Hill St. 3: t. 452.1920; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 164. 2006.

Strobilanthes punctatus Bedd., Ic. t. 204. 1868-1874. *Xenacanthus pulneyensis* (Hook. f.) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 176. 1944; G.R.Kumari in Henry et al., Fl. Tamil Nadu 2: 162.1987. **(PLATE 3: 21)**

Common names: Chonayamkallukurinji (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola floor.

Profusely branched shrubs; branchlets densely hirtus. Leaves ca 6 x 4 cm, elliptic, acuminate, densely hirtus. Spikes peduncled, flattened, 1-3 in axils; bracts 1-3 x 1.2 cm, ovate to orbicular, serrate, densely white hairy at base; bracteoles linear, hairy. Flowers few to many. Sepals 10 mm long, hairy. Corolla 2.5 cm long, tube narrow, 1 cm long, thinly hairy outside. Staminal sheath ciliate. Capsules ca 2.5 cm long, glabrous, minutely stalked. Seeds 2, ovoid.

Flowering & Fruiting: October- December.

Notes: Found in the ecotone region of sholas ± 1840 m, common in Kinnakorai.

22. Strobilanthes sessilis Nees in Wall., Pl. Asiat. Rar. 3: 185. 1832, var. **sessilis**; Hook. f., Fl. Brit. India 4: 452. 1884; Gamble, Fl. Pres. Madras 1042 (731). 1924; Fyson, Fl. South Indian Hill. St. 2: t. 209.1932; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 178. 2006. *Pleocaulus sessilis* (Nees) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect 2, 41: 185. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 157.1987. **(PLATE 3: 22)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Sparingly branched subshrubs; stems terete, strigose. Leaves 2-5 x 3 cm, ovate, acute, sessile, serrate, densely strigose, base cordate. Spikes 3-5 cm long, cylindrical, axillary and terminal; bracts 10 x 7 mm, acuminate, densely hairy. Flowers many, densely arranged. Calyx 9 x 2 mm, lobes lanceolate, hairy. Corolla 3.0 cm long, blue, hairy. Filaments densely hairy.

Flowering & Fruiting: November - December.

Notes: Found in the grassy slopes ± 1800 m, common in Frog Hill veiw.

PSU & NKK, Kodanad, 11.03.1994, 16 (TNFDS).

23. Strobilanthes wightianus Nees in Wall., Pl. Asiat. Rar. 3: 86. 1832; Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1037 (727). 1924; Fyson, Fl. South Indian Hill. St. 2: t. 208.1932; Venu in Daniel & Sanjappa (eds.), Fl.

India ser. 4, Strobilanthes 195. 2006. *Nilgirianthus wightianus* Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41:174.1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 155.1987. **(PLATE 3: 23)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs; branches hirsute. Leaves 7 x 4 cm, ovate, acuminate, serrate, densely hirtus. Spikes 1.5 x 2.5 cm, obconical; peduncle 2-6 cm long; involucral bracts 2-4, leafy, 1-3 x 1.5 cm; floral bracts densely hairy at base; bracteoles linear. Flowers few. Sepals 1 cm long, hairy, united below the middle. Corolla 2 cm long, pale blue, tube 5 mm long, villous inside. Capsule 9 x 3 mm, glabrous. Seeds 3 x 3 mm, orbicular, glabrous, oblique at base.

Flowering & Fruiting: November - March.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2350 m, common in Dodabetta; it flowers almost every year.

PSU & NKK, Kodanad, 22.06.1994, 76 (TNFDH); KRS, Nilgiris, 03.09.1929, 348 (FRC).

24. Strobilanthes zenkerianus Anders., J. Linn. Soc. Bot. 9: 467. 1867; Hook. f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Pres. Madras 1038 (728). 1924; Remadevi & Binojk., Journ. Econ. Tax. Bot. 26: 479. 2002; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 197. 2006. *Endopogon strobilanthes* Wight, Ic. t. 1500. 1850. *Xenacanthus zenkerianus* (Nees) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 176. 1944; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 162.1987. **(PLATE 3: 24)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Gregarious shrubs; branchlets angled, glabrous. Leaves elliptic-ovate, to 10 x 2.5 cm, subcoriaceous, base cuneate, margin serrulate, apex acuminate. Spikes erect, oblong, 6 x 3 cm, terminal or in upper axils; bracts ovate, spathulate below, 2.6 x 1.5 cm; bracteoles 2, linear-lanceolate, 1.3 x 0.2 cm, glabrous. Calyx 1.8 cm, divided nearly to base; lobes 5, lanceolate, 1.6 cm. Corolla blue to violet, 1.5 cm wide; tube 1.2 cm, ventricose above, 2.6 cm; lobes 4. Stamens 4; filament-pairs 5 and 9 mm; staminode 1. Capsule ellipsoid, 2 x 0.5 cm. Seeds 4.

Flowering & Fruiting: December - February.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Madithorai; periodicity of flowering not known, may be rather long period.

THUNBERGIA Retz.

25. Thunbergia tomentosa Wall. ex Nees in Wall., Pl. Asiat. Rar. 3: 78. 1832; Hook. f., Fl. Brit. India 4: 392. 1884; Gamble, Fl. Pres. Madras 1008 (708). 1924; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 163.1987. **(PLATE 3: 25)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Slender twiner; branchlets 4-angular, pilose. Leaves sagittate, to 7 x 3.5 cm, 3-nerved from base, tomentose, base truncate with a tooth on either side, margin distantly serrate, apex acute. Flower solitary, axillary; bract 2.5 x 1.3 cm; pedicel 5 cm. Calyx-teeth ca 15, filiform. Corolla white, 5 cm wide; tube 3.5 cm. Stamens 4. Capsule depressed-globose, 1.2 cm wide; beak 2 cm long. Seeds globose, 4.

Flowering & Fruiting: January - March.

Notes: Found in the degraded forest areas of sholas ± 2310 m, common in Ankinda.

PSU & NKK, Gudalur, 06.03.1991, L b 63 (Cairn Hills).

2. AMARANTHACEAE

ACHYRANTHES L.

26. Achyranthes bidentata Blume, Bijdr. 545. 1826; Gamble, Fl. Pres. Madras 1176 (824). 1925; Fyson, Fl. South Indian Hill St. 3: t. 472. 1920; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 189.1987. **(PLATE 3: 26)**

Common names: Cherukadaladi, Nayaruvichedi (M); Sighapu Naaiyuruvi (T).

Distribution: Indo-Malesia to Australia and East Asia. *Habitat*: Shola border.

Scandent herbs; stem glabrous. Leaves 10-16 x 2-2.5 cm, linear-lanceolate, apex acuminate, thinly pubescent. Spike axillary and terminal, 15-30 cm long, narrow, glabrous; bracts 4 x 1.5 mm, lanceolate, long-aristate; bracteoles 3 mm long, entire, aristate. Flowers distant; tepals equal, 7 x 1.5 mm, lanceolate, acuminate, glabrous. Achenes 3 x 1.5 mm, cylindrical, longitudinally striate, reddish-brown.

Flowering & Fruiting: September - December.

Utility: Used in Ayurveda, Folk and Unani systems of medicine. It is used as an emmenagogue, and in treatment of piles and skin eruptions. Decoction of the plant is useful in pneumonia and renal dropsy. The juice of the plant is reported to be used in treatment of ophthalmia and dysentery. The ashes of the plant is used to treat dropsy, asthma and cough. The leaves are used to treat gonorrhoea and excessive perspiration. The flowers, ground and mixed with curd and sugar, are given as a medicine to treat menorrhagia. The flower-tops are stated to be employed for the treatemtnt of rabies. Powdered seeds are soaked in butter-milk and given to treat biliousness; the seeds are said to be emetic.

Notes: Found in the wayside bushes of sholas ± 2220 m, common in Pykara.

PSU & NKK, Naduvattam, 12.02.1991, II b 28 (Cairn Hills); PSU & NKK, Kodanad, 20.03.1994, 211 & 05.10.1994, 215 (TNFDH); KNS, Uppalt RF, 07.02.1963, 16 (FRC).

3. AMARYLLIDACEAE

AGAPANTHUS L.

27. Agapanthus africanus (L.) Hoffmanns., Verz. Pfl.-Kult. 35. 1824. *Crinum africanum* L., Sp. Pl. 292. 1753. *Mauhlia africana* (L.) Dahl, Observ. Bot. 26. 1787. *Crinum floridum* Salisb., Prodr. Stirp. Chap. Allerton 228. 1796, nom. superfl. *Tulbaghia africana* (L.) Kuntze, Rev. Gen. Pl. 2: 718. 1891. *Abumon africanum* (L.) Britton, Fl. Bermuda 72. 1918. **(PLATE 3: 27)**

Common names: African lily (E).

Distribution: Native of South Africa. *Habitat*: Grown as garden plant; run wild.

Perennial herbs from a short, creeping rootstock with numerous thick roots. Leaves many, radical, lorate, to 75 x 3.5 cm, apex obtuse. Flowers up to 50 to the umbel, each subtended by a foliaceous bracteole. Perianth petaloid, deep blue to white, gamophyllous, to 4.5 cm wide; tube 2 cm; lobes oblanceolate, spreading. Stamens 6, inserted at throat of tube, blue, twisted. Capsule 3-sided, to 3 x 1.2 cm. Seeds numerous, minute.

Flowering & Fruiting: Throughout the year.

Notes: This plant is cultivated as an ornamental, now found as a run wild in Ooty town ± 2100 m.

PSU & NKK, Botanical Garden, 23.03.1991, a 66 (Cairn Hills).

4. APIACEAE (UMBELLIFERAE)

1. Prostrate herbs; leaves simple 2
1. Erect herbs or procumbent herbs; leaves pinnate or pedate 3

2. Leaves digitately 7-9-lobed; flowers white .... *Hydrocotyle*
2. Leaves not lobed; flowers red .... *Centella*

3. Procumbent herbs; plants rooting at nodes .... *Vanasushava*
3. Erect herbs; plants not rooting at nodes 4

4. Umbels in groups of 3 .... *Sanicula*
4. Umbels compound 5

5. Fruits laterally compressed 6
5. Fruits dorsally compressed .... *Heracleum*

6. Leaves entire, flowers yellow .... *Bupleurum*
6. Leaves pinnate or decompound, flowers white 7

7. Fruit subglobose .... *Pimpinella*
7. Fruits ovoid, ellipsoid or oblong .... *Bunium*

BUNIUM L.

28. Bunium nothum (Clarke) P.K. Mukh., Bull. Bot. Surv. India 24: 43. 1983; P.K. Mukh. & Constance, Umbell. India 71. 1993. *Carum nothum* Clarke in Hook. f., Fl. Brit. India 2: 681. 1879; Gamble, Fl. Pres. Madras 559 (394). 1919; Fyson, Fl. South Indian Hill St. 3: 57. 1932. *Bunium nilghirense* Wolf., Feddes Repert. 27:334. 1930.

Distribution: India and Sri Lanka. *Habitat*: Grasslands.

Decumbent herbs with tuberous roots; stem terete, glabrous. Leaves bipinnate; pinnae trifoliate; leaflets to 6 x 2.5 cm, ovate, acuminate at apex, sharply serrate. Umbels compound, to 10 cm broad; leaf-opposed, rays 16, each to 6 cm long; 12-14 together, slender. Flowers 1 mm across. Calyx 5-toothed. Petals 5, white, broadly ovate, cuspidate at apex with a strong midrib. Stamens 5, erect. Fruit 2 x 1.5 mm, ovoid, obtuse, mericarps 6-ridged, glabrous, brown.

Flowering & Fruiting: August - December.

Notes: Found in the grasslands ± 2150 m, common in Sispara.

BUPLEURUM L.

1.	Bracts and bracteoles broad	***B. plantaginifolium***
1.	Bracts and bracteoles linear	**2**
2.	Leaves oblong, Lanceolate, obtuse at apex	***B. mucronatum***
2.	Leaves linear-oblong, acute at apex	***B. distichophyllum***

29. Bupleurum distichophyllum Wight & Arn., Prodr. 370. 1834; Gamble, Fl. Pres. Madras 558 (394). 1919; Fyson, Fl. South Indian Hill St. 2: t. 127. 1932; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 178.1983; P.K. Mukh. & Constance, Umbell. India 59. 1993. **(PLATE 4: 28)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Slender, flexuous herbs. Basal leaves petiolate, oblong-ovate, to 2 x 0.3 cm; lower cauline leaves distichous, linear-subulate, to 6 x 0.3 cm, acuminate; upper cauline leaves gradually smaller upwards. Umbels terminal and in upper axils; involucral bracts ca 5, to 1 cm long. Rays 5-8, slender, to 2 cm. Umbellules 15-20-flowered; bracteoles 5, to 0.5 cm. Petals yellow, obovate. Stylopodium conical. Fruit to 2 mm, ribs not winged.

Flowering & Fruiting: June - October.

Notes: Found in the bare slopes of grasslands ± 2210 m, common in Pykara.

PSU & NKK, Kalhatty, 27.03.1991, a 4 (Cairn Hills).

30. Bupleurum mucronatum Wight & Arn., Prodr. 370. 1834; Gamble, Fl. Pres. Madras 568 (394). 1919; Fyson, Fl. South Indian Hill St. 2: t. 126. 1932; P.K. Mukh. & Constance, Umbell. India 57. 1993. *Bupleurum ramosissimum* Wight & Arn., Prodr. 370. 1834. *Bupleurum falcatum* var. *ramosissimum* (Wight & Arn.) Dalz. & Gibs., Bombay Fl. 108. 1861. *Bupleurum mucronatum* Wight & Arn. var. *ramosissimum* (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 676. 1879; Gamble, Fl. Pres. Madras 568 (394). 1919. *Bupleurum wightii* P.K. Mukh., Indian For. 95: 567. 1969, non Kozo-Polj. 1913; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 178.1983. **(PLATE 4: 29)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Stout, branched herbs. Basal and lower cauline leaves oblong to oblanceolate, to 15 x 1 cm, base narrow, apex acute, mucronate; upper cauline leaves narrowed and

amplexicaul. Inflorescence open with several terminal and axillary umbels. Involucre of 3-5 lanceolate bracts, to 10 x 2 mm. Rays 3-5, unequal. Umbellules 4-10-flowered. Involucel of bracteoles lanceolate, 5. Petals yellow, obovate. Fruit elliptic, 3.5 x 2.5 mm; ribs prominent, not winged.

Flowering & Fruiting: November - January.

Notes: Found in grasslands ± 2000 m, common in Kodanad.

PSU & NKK, Kalhatty, 27.03.1991, a 3 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 17, 431 (TNFDS).

31. Bupleurum plantaginifolium Wight, Ic. t. 281.1840; Hook. f., Fl. Brit. India 2: 674.1879; Gamble, Fl. Pres. Madras 557 (393). 1919; P.K. Mukh. & Constance, Umbell. India 59. 1993; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 178.1983.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Stout branched herbs. Basal and lower cauline leaves oblong to broad-oblanceolate, to 25 x 2.5 cm, base narrow, finally amplexicaul, apex obtuse, mucronate; upper cauline leaves crowded, narrower. Umbels terminal and axillary. Involucral bracts 5, foliaceous, obovate, 2.5 x 0.5 cm. Rays 6-12, to 3 cm. Umbellules 4-14-flowered. Involucel of 4-6 oblong, obtuse, mucronate; bracteoles to 1.2 cm. Petals elliptic, yellow. Stylopodium depressed. Fruit oblong-obovate, to 8 x 4 mm; mericarps 5-gonal in transection; ribs prominent, winged.

Flowering & Fruiting: December - March.

Notes: Found in the ecotone region of sholas ± 2390 m, common in Dodabetta.

CENTELLA L.

32. Centella asiatica (L.) Urban in Mart., Fl. Bras. 11:287. t.78. f. 1879; Gamble, Fl. Pres. Madras 556 (392). 1919; Fyson, Fl. South Indian Hill St. 3: t. 346. 1920; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 179. 1983. *Hydrocotyle asiatica* L., Sp. Pl. 234. 1753. **(PLATE 4: 30)**

Common names: Indian penny-wort (E); Elikivi soppu, Ondelaga, Thambooli soppu (K); Kodangal, Kuthirakkulambuchedi, Mutthil (M); Vallarai (T).

Distribution: Tropical Asia and Africa. *Habitat*: Grasslands.

Slender prostrate herbs, stem creeping with rooted nodes and long internodes. Leaves orbicular-reniform, 3-5 cm across, crenate or sub-entire, glabrous, nerves radiating; petiole to 12 cm long, sheathing at base. Flowers sessile, pink, in 2-5 flowered umbels. Calyx tube 1 mm long, adnate to the ovary, lobes minute. Petals 4, 1 mm long, oblong, recurved at apex, pink. Stamens 5, filaments erect. Fruit ovoid, 3-4 mm long, reticulate-rugose, 7-9-ribbed.

Flowering & Fruiting: Throughout the year.

Utility: Used in Ayurveda, Folk, Homeopathy, Tibetian and Unani systems of medicine. This plant is considered useful in the treatment of leprosy, treating insomnia, cardiac debility, epilepsy, hoarseness, asthma, bronchitis, cough, abdominal disorders and fever. The leaves are reported to be useful in abdominal disorders, due to dysentery, in children. Used this to make chutney.

Notes: Found in grasslands ± 2190 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, a 55 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 409 & 20.10.1995, 352 (TNFDH).

HERACLEUM L.

1. Lower leaves pinnate .... ***H. rigens***
1. Lower leaves bipinnate **2**

2. Fruit large, elliptic, 7-10 x 4-7 mm, biconvex .... ***H. sprengelianum***
2. Mericarps small, to 6 x 3 mm .... ***H. candolleanum***

33. Heracleum candolleanum (Wight & Arn.) Gamble, Fl. Pres. Madras 565 (399). 1919; P.K. Mukh. & Constance, Umbell. India 243. 1993; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 179.1983. *Pastinaca candolleana* Wight & Arn., Prodr. 372. 1834. *Heracleum rigens* Wall. ex DC. var. *candolleana* (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 715. 1879, p. p. *Heracleum rigens* var. *ligusticifolium* (Wight) Clarke in Hook. f., Fl. Brit. India 2: 716. 1879. *Heracleum courtallense* Gamble, Fl. Pres. Madras 565 (399). 1919. **(PLATE 4: 31)**

Common names: Kattugeerakam, Kattumally (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs; stem ridged. Leaves 35-45 x 20-25 cm, 1 or 3 pinnate; leaflets 7-9 or more, to 15 x 10 cm, lobed, apex acute, serrate, scabrous, coriaceous. Umbels compound,

terminal, corymbose; secondary peduncles to 6 cm long; rays 13, each 3-5 cm long, spreading. Flowers white, 5-merous, 2 mm across. Calyx 5-toothed. Petals 3, ovate, acuminate, with a strong midrib, glabrous. Stamens 5, free, anthers ovate. Fruit 7-10 x 4-7 mm, biconvex, dorsally compressed, winged, glabrous.

Flowering & Fruiting: April - October.

Utility: Used in Folk medicine.

Notes: Found in the exposed slopes of sholas ± 2180 m, common in Pykara.

34. Heracleum rigens Wall. ex DC., Prodr. 4: 191. 1830; Gamble, Fl. Pres. Madras 564 (398). 1919; Fyson, Fl. South Indian Hill St. 3: t. 348. 1920; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 179.1983; P.K. Mukh. &Constance, Umbell. India 240. 1993. *Pastinaca rigens* (Wall. ex DC.) Wight, Ic.t. 1009. 1845. *Heracleum rigens* Wall. ex DC. var. *multiradiatum* Gamble, Fl. Pres. Madras 565(398). 1919. *Heracleum rigens* Wall. ex DC. var. *elongatum* Gamble, Fl. Pres. Madras 565(399). 1919. **(PLATE 4: 32)**

Common names: Nagadali (K); Chittelam (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Large perennial, tuberous herbs. Leaves large, 2-3 pinnate. Rachis 50-75 cm long, sheathed at base; leaflets variously lobed, very varying in size, becoming smaller towards tip, serrate on margins, hairy on both sides. Flowers on large, erect compound umbels. Involucre bracts 2-3, 0.1-1 cm long, ovate lanceolate. Calyx tube 0.05-0.1 cm long; lobes 5, lanceolate. Petals 5, 0.1-0.15 cm long, creamy, ovate, emarginate at tip. Stamens 5, exserted. Fruit 1 x 0.6 cm, elliptic, laterally compressed, 3-ridged.

Flowering & Fruiting: August - September.

Utility: Used in Folk medicine.

Notes: Found in the bare slopes of sholas ± 2010 m, common in Governor shola.

KNS, Geddersal Shooting lodge, 30.06.1971, 21564 (FRC).

35. Heracleum sprengelianum Wight & Arn., Prodr. 372. 1834; Gamble, Fl. Pres. Madras 565(399). 1919; Fyson, Fl. South Indian Hill St. 3: t. 350. 1920; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 180.1983; P.K. Mukh. & Constance, Umbell. India 241. 1993. *Pastinaca sprengeliana* (Wight &

Arn.) Wight, Ic. t. 1008. 1845. *Tetrataenium sprengelianum* (Wight & Arn.) Manden., Trudy Tbilissi Bot. Inst. 20: 17. 1959. **(PLATE 4: 33)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Large perennial tuberous herbs. Leaves large, 1-2 pinnate, to 30 x 20 cm, ovate, hirsute; leaflets ovate, middle one often divided again; base rounded, apex acuminate, margin crenate-serrate; cauline leaves many. Umbels terminal or in upper axils; umbellules 16-18 flowered. Calyx absent. Petals small. Mericarps to 6 x 3 mm.

Flowering & Fruiting: September - November.

Notes: Found in grassy places near the sholas ± 2010 m, common in Kodanad.

HYDROCOTYLE L.

1. Leaves 7-lobed .... ***H. sibthorpioides***
1. Leaves 7-9 lobed **2**

2. Umbel-peduncles solitary sessile .... ***H. conferta***
2. Umbel-peduncles clustered .... ***H. javanica***

36. Hydrocotyle conferta Wight, Ic. t. 1002. 1845; Gamble, Fl. Pres. Madras 556(392). 1919; Fyson, Fl. South Indian Hill St. 2: t. 124. 1932; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 180.1983; P.K. Mukh. & Constance, Umbell. India 13. 1993. **(PLATE 4: 34)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Prostrate herbs, rooting at nodes; branchlets villous. Leaves alternate, orbicular-reniform, 2.5-3.5 cm wide, 7-9 lobed; lobes triangular, crenate; stipules scarious. Umbel single, axillary, 5-15- flowered, subsessile. Involucre obscure. Flowers sessile. Calyx obsolete. Petals 5, cream, oblong, 1 mm, inflexed, valvate. Stamens 5. Fruit suborbicular, strongly flattened laterally, shortly stipitate, 5-9 in a cluster. Seed 1.

Flowering & Fruiting: January - August.

Notes: Found in shade, floor and edges of sholas ± 2180 m, common in Pykara.

PSU & NKK, Pykara, 27.01.1991, II a 6 (Cairn Hills).

37. Hydrocotyle javanica Thunb., Diss. Hydroc. n. 17. t. 2. 1798; Gamble, Fl. Pres. Madras 556(392). 1919; Fyson, Fl. South Indian Hill St. 2: t. 123. 1932; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 180.1983.

Hydrocotyle hispida Buch.-Ham ex D. Don, Prodr. Fl. Nepal. 182. 1825. *Hydrocotyle polycephala* Wight & Arn., Prodr. 366. 1834. **(PLATE 4: 35)**

Common names: Vaite-kala, Vella-vaite (M).

Distribution: Tropical Asia. *Habitat*: Shola border.

Prostrate herbs, spreading by runners, rooting at nodes; young stem, peduncle and pedicels densely pubescent with curled hairs. Leaves alternate, 1.5-3.5 x 2.5-6 cm, orbicular, broader than long, 7-9 lobed, sparsely hairy on both sides, variously serrate on margins. Flowers sessile in capitate clusters, umbelled on 1-6 cm long peduncles. Involucral bracts scaly. Calyx tube 0.5 cm long, 5-toothed. Petals 5, 1-1.5 cm long, lanceolate. Stamens 5. Fruit 0.1 x 0.2 cm, 3-ridged.

Flowering & Fruiting: October - May.

Utility: Used in Folk medicine. Leaves are used as blood purifier and also used for indigestion, nervousness and dysentry; leaf-stalks used in toothache.

Notes: Found in shady and moist shola floor ± 2190 m, common in Pykara.

PSU & NKK, Pykara, 02.02.1991, a 7 (Cairn Hills); KNS, Kansagiribetta, 17.05.1968, 3417 (FRC).

38. Hydrocotyle sibthorpioides Lam., Encycl. 3: 153. 1789; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 180.1983; P.K. Mukh. & Constance, Umbell. India 12. 1993. *Hydrocotyle tenella* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 183. 1825. *Hydrocotyle rotundifolia* Roxb. ex DC., Prodr. 4: 64. 1830; Gamble, Fl. Pres. Madras 556(392). 1919; Fyson, Fl. South Indian Hill St. 3: t. 345. 1920. **(PLATE 4: 36)**

Common names: Lawn pennywort (E).

Distribution: Tropical Asia, Africa, China, and Japan; introduced into America, Australia and India. *Habitat*: Shola border.

Slender creeping herbs, rooting at nodes, glabrous. Leaves 7-9 lobed, lobes crenate, villous beneath. Umbels peduncled, solitary. Flowers greenish-yellow, densely packed. Petals 2 mm long, oblong, greenish. Fruit 0.7 x 0.7 mm, mericarps hemispherical, compressed, muricate.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Found in marshy grounds of sholas ± 2200 m, common in Pykara water falls.

PIMPINELLA L.

1. Fruits glabrous .... *P. leschenaultii*
1. Fruits papillose, scabrous .... *P. candolleana*

39. Pimpinella candolleana Wight & Arn., Prodr. 369. 1834; Gamble, Fl. Pres. Madras 560(395). 1919; Fyson, Fl. South Indian Hill St. 2: t. 129. 1932; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 180.1983; P.K. Mukh. & Constance, Umbell. India 148. 1993. *Carum candolleanum* (Wight & Arn.) Franchet, Bull. Soc. Philom. Paris VIII 6: 128. 1894. **(PLATE 5: 37)**

Common names: Kattumalli (M).

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Erect or decumbent herbs; stem terete. Leaves alternate, 5-7 cm across, lower leaves orbicular, upper ones 3-lobed, cordate at base, toothed. Umbels terminal, panicled; rays 10; secondary rays many, each 3 cm long. Flowers 9-16 in an umbellule, 1.5 mm across, white. Calyx shortly 5-toothed. Petals 5, 1 mm long, orbicular. Stamens 5. Fruit 3 x 2 mm, ovate, densely villous, rugose.

Flowering & Fruiting: August - November.

Notes: Found in the bare slopes of grasslands ± 2380 m, common in Mukurthi.

MPRR, Ootacamund, 00.10.1929, 20932 (FRC).

40. Pimpinella leschenaultii DC., Prodr. 4: 122. 1830; Hook. f., Fl. Brit. India 2: 687. 1879; Gamble, Fl. Pres. Madras 560(395). 1919; Fyson, Fl. South Indian Hill St. 2: t. 128. 1932; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 181.1983; P.K. Mukh. & Constance, Umbell. India 141. 1993. **(PLATE 5: 38)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Weak-stemmed herbs; branchlets pubescent. Basal leaves simple, broadly cordate, 4-7 cm wide, palmately 3-5-nerved; sinus oblong-rounded, 1.5-2 x 0.6-1.8 cm, chartaceous, margin dentate, apex acute; cauline ones 3-foliolate, 3-4 cm wide; leaflets obovate, or oblique ovate, 1.5 cm wide, cuneate, margin dentate, apex acute. Umbels

compound, terminal in upper axils, 3 x 4 cm; peduncle 5 cm; bracts lanceolate. Rays 6-16, each to 3 cm. Umbellules 6-12-flowered. Sepals absent. Petals 5, white, obovate, to 1.4 x 1.2 mm. Stamens 5. Fruit oblong-obovate, to 4 x 2 mm.

Flowering & Fruiting: March- August.

Notes: Found in the ecotone region of sholas ± 2190 m, common in Pykara.

PSU & NKK, Porthimund, 15.02.1991, a 9 (Cairn Hills); PSU & NKK, Kodanad, 10.07.1995, 254 (TNFDH); KNS, Glenmorghan, 11.05.1963, 512 (FRC).

SANICULA L.

41. Sanicula elata Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 183. 1825; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 181.1983; P.K. Mukh. & Constance, Umbell. India 17. 1993. *Sanicula hermaphrodita* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 183. 1825. *Sanicula europaea* sensu Clarke in Hook. f., Fl. Brit. India 2: 670. 1879, non L. 1753; Gamble, Fl. Pres. Madras 556(393). 1919; Fyson, Fl. South Indian Hill St. 3: t. 347. 1920.

Distribution:South Eastern Asia from Pakistan to Western China and Southern Japan, to South Eastern Africa. *Habitat*: Shola border.

Herbs; branchlets ascending, striate, dichasially branched above. Leaves palmately 3-foliolate, chartaceous; principal segments ovate, 3-6 x 2-3.5 cm, base cuneate, margin dentate, apex acuminate. Umbels simple, cymosely arranged, terminal, also in upper axils, to 15 cm. Involucre of 2-6 lanceolate bracts. Each umbel of 3-6 staminate flowers, and 3 bisexual flowers. Sepals 5, lanceolate. Petals 5, obovate, white. Stamens 5. Fruit ovoid-oblong, 3 x 2.5 mm, densely covered with uncinate bristles; vittae several. Seed 1.

Flowering & Fruiting: April - October.

Notes: Found in the shola floor ± 2090 m, common in Glenmorgan.

VANASUSHAVA P. K. Mukh.

42. Vanasushava pedata (Wight) P.K. Mukh. & Constance, Kew Bull. 29: 595. 1974 & Umbell. India 90. 1993; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 181.1983. *Heracleum pedatum* Wight, Ic. t. 342. 1840; Gamble, Fl. Pres. Madras 565(399). 1919. **(PLATE 5: 39)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Procumbent herbs, rooting at lower nodes. Leaves pedate, 5-foliolate; leaflets to 4.5 x 2.5 cm, ovate, acute, serrate, scabrous; petiolule to 1 cm long; petiole to 13 cm long, sheathing at base. Umbels compound, 5 cm across; rays few, slender. Flowers white, 1.5 mm across. Calyx 5-toothed. Petals white, unequal, orbicular, cuspidate. Stamens 5, free, filaments erect. Mericarps unequally winged.

Flowering & Fruiting: June - October.

Notes: Found in the undergrowth of shola ± 2280 m, common in Ankinda.

5. APOCYNACEAE

RAUVOLFIA L.

43. Rauvolfia verticillata (Lour.) Baill., Bull. Soc. Linn. Paris 1: 768. 1888. *Dissolena verticillata* Lour., Fl. Cochinch. 137. 1790. *Tabernaemontana densiflora* Wall., Bot. Reg. 15: t. 1273. 1829. *Rauvolfia densiflora* (Wall.) Benth. ex Hook.f., Fl. Brit. India 3: 633. 1882; Gamble, Fl. Pres. Madras 808(567). 1923; Fyson, Fl. South Indian Hill St. 3: t. 417. 1920; S.R. Sreenivas. in Henry et al., Fl. Tamil Nadu 2: 75.1987. *Ophioxylon neilgherrense* Wight, Ic. t. 1292. 1848. *Ophioxylon ceylanicum* Wight, Ic. t. 1291.1848. **(PLATE 5: 40)**

Common names: Kalli (K); Amalpori, Vanduvara (M); Amalpori, Paarisirunilapatchilai (T).

Distribution: South and South East Asia. *Habitat*: Shola border.

Shrubs; branchlets glabrous; sap milky latex. Leaves 10-14 x 4-6 cm, elliptic to obovate-lanceolate, apex abruptly acuminate, base acute to attenuate, subcoriaceous. Cymes terminal or axillary. Flowers white. Calyx lobes acuminate, glabrous, reddish. Corolla salver-shaped, 1 cm long, tubular below, inflated above, white. Stamens 5, inserted; lobes ovate, acute. Capsule ellipsoid, 10 x 7 mm, oblong, black.

Flowering & Fruiting: March- October.

Notes: Found in the shola floor ± 1800 m, common in Kunjapanai.

PSU & NKK, Dolphin Nose, 11.02.1991, L b 36 (Cairn Hills); KNS, Kodanad, 07.05.1963, 440 (FRC).

6. AQUIFOLIACEAE

ILEX L.

1. Flowers 4-merous .... *I. denticulata*
1. Flowers 5-merous 2

2. Leaves elliptic-obovate, mucronate or emarginate at apex .... *I. walkeri*
2. Leaves elliptic, ovate lanceolate, acuminate at apex 3

3. Large trees, umbels subsessile .... *I. wightiana*
3. Shrubs, peduncles ca. 1 cm long .... *I. gardneriana*

44. Ilex denticulata Wall. ex Wight, Illustr. 2: t. 142. 1850; Hook. f., Fl. Brit. India 1: 600. 1875; Gamble, Fl. Pres. Madras 200(144). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 305.1920; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 72.1983; Basu in N.P. Singh et al., Fl. India 5: 53. 2000. **(PLATE 5: 41)**

Common names: Thudai (T).

Distribution: Peninsular India, Sri Lanka and China. *Habitat*: Shola forests.

Trees, to 15 m high; bark 1.3 cm thick, grey, smooth; branchlets glabrous. Leaves simple, alternate, estipulate; lamina 5-16 x 2-3 cm, elliptic-oblong, obovate or elliptic, base cuneate or subacute, apex acuminate, margin dentate or serrate, coriaceous, glabrous. Flowers unisexual, white, 4-merous, 6 mm, across; male flowers: in branched short axillary cymes. Calyx tube cupular, 0.5 mm, lobes 4, persistent broad, subacute. Petals 4, 4 x 2 mm, white, oblong, connate at the very base. Stamens 4, adhering to the base of the corolla; filaments subulate; disc absent. Pistillode globose. Female; in fascicles. Calyx as in male flowers. Petals free. Staminodes hypogynous. Ovary ovoid, syncarpous. Fruit a drupe, globose, 6-7 mm across, brown, smooth, with persistent calyx and 4-lobed. Pyrenes 4, oblong-elliptic, 4-5 x 3 mm, striate or rugose.

Flowering & Fruiting: January - May.

Propagation: The seeds are viable for about 2 weeks. The blue coloured fruits collected from healthy matured trees are soaked in water for overnight and depulped. The depulped white coloured seeds are dried and sown in mother beds. Germination is noticed between 25 to 35 days. Germination is of about 80 percentage.

Notes: A typical large shola tree ± 1990 m, common in Longwood.

PSU & NKK, Kalhatty, 13.02.1991, c 11; Kodanad, 16.03.1991, I c 10 (Cairn Hills); KNS, Staircase shola, 23.04.1964, 1259 (FRC).

45. Ilex gardneriana Wight, Ic. t. 1217. 1848; Hook. f., Fl. Brit. India 1: 603. 1875; Gamble, Fl. Pres. Madras 200(144). 1915; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 72.1983; D. Basu in N.P. Singh et al., Fl. India 5: 57. 2000. **(PLATE 5: 42)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Trees, branchlets glabrous, terete. Leaves simple, alternate; lamina 5-7.5 x 2-2.5 cm, elliptic-oblong, ovate or ovate-lanceolate, base obtuse or round, apex acuminate, margin entire, revolute, coriaceous, glabrous. Flowers unisexual, 5-merous; male flowers: solitary or in fascicles. Calyx lobes 5, 1.5 x 1 mm, triangular, ciliolate. Petals 5, oblong, obtuse, connate at base. Stamens as long as petals. Fruit a berry 4.5 x 3 mm, yellowish, glabrous.

Flowering & Fruiting: March - April.

Notes: A typical shola tree ± 2000 m, common in Pykara.

46. Ilex walkeri Wight & Gard. ex Thw., Enum. Pl. Zeyl. 184. 1860; Hook. f., Fl. Brit. India 1: 600. 1875, p.p.; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 72.1983; D. Basu in N.P. Singh et al., Fl. India 5: 72. 2000. *Ilex thwaitesii* Loes. ex Gamble, Fl. Pres. Madras 200(143). 1915. **(PLATE 5: 43)**

Common names: Noola (M).

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Shrubs or small trees; branchlets glabrous. Leaves alternate, elliptic-obovate; lamina 5-12 x 2.5-3.5 cm, cuneate to obtuse at base, subentire and recurved at margin, mucronate or retuse at apex, coriaceous or membranous and glabrous; stipules subulate-deltoid, to 7.5 mm long, subpersistent. Inflorescences umbels; peduncles and pedicels short in both sexes. Flowers 4 or 5-merous. Calyx 4-lobed; lobes subulate, deltoid and glabrous. Petals 4 or 5, white, connate at base, orbicular or ovate, ca 2.5 x 1.25-4.7 mm. Stamens 4 or 5, included. Ovary 5-celled; stigma 5-lobed. Drupes globose, ca 4 mm, red; pyrenes 4 or 5, 3-gonous, hard.

Flowering & Fruiting: March- August.

Notes: A typical small shola tree ± 2100 m, common in Parsons valley.

47. Ilex wightiana Wall. ex Wight, Ic. t. 1216. 1848, var. **wightiana**; Hook. f., Fl. Brit. India 1: 603. 1875; Gamble, Fl. Pres. Madras 200(143). 1915; Fyson, Fl.

South Indian Hill St. 2: t. 59. 1932; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 72.1983; D. Basu in N.P. Singh et al., Fl. India 5: 73. 2000. **(PLATE 5: 44)**

Common names: Hurulu (K); Parasal, Vellodi (M); Vellodai (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Trees up to 15 m tall; branchlets glabrous. Leaves elliptic, ovate, oblong or oblanceolate; lamina 5-14 x 3.5-4.5 cm, acute or rounded at base, subentire or serrulate at margin, acute to acuminate, mucronate-apiculate or rarely obtuse at apex, glabrescent. Inflorescences in umbellules; peduncles of male inflorescences 0.8-1.25 cm long; flowers 5-merous, 5-6 mm across. Calyx cupular, 1-2 x 2-2.5 mm; lobes 5 or 6, oblong-ovate, ovate or oblong, acute-apiculate, sometimes obtuse at apex, ciliate at margin, puberulous. Petals 5 or 6, connate below, white; tube ca 1 mm long; lobes oblong, oblong-obovate or ovate-elliptic, entire at margin, obtuse at apex, 2-2.5 x 1.5-2 mm. Stamens 5 or 6, shorter than petals, epipetalous. Female umbels lax. Calyx and petals as in male flowers. Ovary globose, ca 2 mm, 6-loculed. Drupes globose, apiculate, smooth, dark red or blue; pyrenes 5 or 6, 3-gonous.

Flowering & Fruiting: March- August.

Propagation: The seeds are viable for two weeks. The fruits are soaked in water for overnight and depulped white colour seeds are sown in a mother bed containing red soil and sand in 1:1 ratio. The germination is about 80%.

Notes: A typical small shola tree ± 2210 m, common in Sispara.

PSU & NKK, Pykara Check Dam, 26.01.1991, I c 21 (Cairn Hills); KNS, Longwood, 20.04.1964, 1204 (FRC).

7. ARACEAE

1.	Marshy plants with distichous leaves, aromatic	***Acorus***
1.	Terrestrial plants with simple or compound leaves	**2**
2.	Leaves simple, deeply lobed	**3**
2.	Leavs compound, leaflets pedately arranged	***Arisaema***
3.	Spathe broad, large, white	***Zantedeschia***
3.	Spathe linear, small, yellow	***Colocasia***

ACORUS L.

48. Acorus calamus L., Sp. Pl. 324. 1753; Hook. f., Fl. Brit. India 6: 555. 1893; Gamble, Fl. Pres. Madras 1577(1100). 1931; P. Bargh. in A.N. Henry et al., Fl. Tamil Nadu 3: 54.1989. **(PLATE 5: 45)**

Common names: Sweet flag (E); Vasa (K); Vayambu (M); Vasambu (T).

Distribution: North temperate hemisphere and Tropical Asia. *Habitat*: Marshy areas.

A strongly aromatic semi-aquatic perennial herbs; rhizomes creeping, jointed, somewhat vertically compressed, 1.3-2.5 cm thick, pale to dark brown and spongy inside. Leaves narrow, up to 80 cm long, linear to narrowly ensiform, glossy bright green, apex acute, base amplexicaul; petioles sheathing for 20-50 cm. Flowers pale green, fragrant, arranged compactly on a sessile, cylindrical, stumpy spadix 5-7 cm long. Berries green, angular, 3-celled, fleshy, containing 1-3 oblong seeds.

Flowering & Fruiting: April - July.

Utility: Used in Ayurveda, Folk, Siddha, Tibetian and Unani systems of medicines. Rhizomes are used in rheumatism, ear ache, psychosis, epilepsy, anorexia, distaste, inflammation of throat, piles, hoarseness of voice and speech, urinary calculi, obesity and typhoid, and improves memory power, intelligence, digestion, cures diarrhoea, dysentery and abdominal obstruction.

Notes: Naturalised in swampy regions of sholas ± 2100 m, common in Glenmorgan. The red listed status of this species is "Endangered" for Kerala and "Vulnerable" for Tamil Nadu.

PSU & NKK, Glenmorgan, 20.02.1991, b 14 (Cairn Hills).

ARISAEMA Mart.

1. Leaf solitary, radiatisect; spadix appendix erect, included within spathe .... *A. leschenaultii*
1. Leaves 2, pedatisect; spadix appendix sigmoid, excerted .... *A. tortuosum*

49. Arisaema leschenaultii Blume, Rumphia 1: 93. 1836; Hook. f., Fl. Brit. India 6: 504. 1893; Gamble, Fl. Pres. Madras 1585(1105). 1931; Chatterjee, Bull. Bot. Soc. Bengal 8: 127. 1959; Fyson, Fl. South Indian Hill St. 2: t. 271. 1932; P. Bargh. in A.N. Henry et al., Fl. Tamil Nadu 3: 55.1989. *Arisaema pulchrum* N. E. Br., J. Linn. Soc. Bot. 18: 252, t. 6. 1880; Hook. f., Fl. Brit. India 6:505.1893; Gamble, Fl. Pres. Madras 1585(1105). 1931. *Arisaema convolutum*

C.E.C. Fisch., Bull. Misc. Inform. Kew 1934: 167. 1934, non Nakai, 1929. *Arisaema tuberculatum* C.E.C. Fisch., Bull. Misc. Inform. Kew 1935: errata slip opposite p. 65. 1935; Chatterjee, Bull. Bot. Soc. Bengal 8: 137. 1959. *Arisaema attenuatum* Barnes & C.E.C. Fisch., Bull. Misc. Inform. Kew 1936: 275. 1936; Chatterjee, Bull. Bot. Soc. Bengal 8: 121. 1959. **(PLATE 6: 46)**

Common names: Pambucholam (M); Paambu-cheidi (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Herbs, corm 1-6 cm across. Leaflets 7-12, 15-25 x 5-7 cm, lanceolate, apex acuminate; nerves many, close, parallel, forming an intramarginal vein, prominent, glabrous; petiole to 70 cm long, 1-3 cm thick, brownish. Peduncle thick, smaller than the petiole. Spathe 10-22 cm long, tube 5-15 cm long, 1-3.5 cm broad, with thick greenish brown streaks; limb ovate, apex curved down, finely acuminate, green with brown streaks. Spadix 11-15 cm long, clavate at apex. Female flowers many in lower 1-3 cm long; neuter flowers filiform, simple or bifurcate, to 1 cm long.

Flowering & Fruiting: July - September.

Utility: Used in Folk medicine.

Notes: Found in shady region of sholas ± 2200 m, common in Pykara.

PSU & NKK, Wenlockdowns, 20.02.1991, b 15 (Cairn Hills); KNS, Longwood, 08.05.1963, 465 (FRC).

50. Arisaema tortuosum (Wall.) Schott in Schott & Endl., Melet. Bot. 1: 17. 1832, var. **tortuosum**; Hook. f., Fl. Brit. India 6: 502. 1893; Gamble, Fl. Pres. Madras 1584(1105). 1931; Chatterjee, Bull. Bot. Soc. Bengal 8: 136. 1959; Fyson, Fl. South Indian Hill St. 2: t. 270. 1932; P. Bargh. in A.N. Henry et al., Fl. Tamil Nadu 3: 56.1989. *Arum tortuosum* Wall., Pl. Asiat. Rar. 2: 10, t. 114. 1830. **(PLATE 6: 47)**

Common names: Whipcord Cobra Lily (E); Kaattu-chenai (T).

Distribution: Himalayas, South India and Sri Lanka. *Habitat*: Shola border.

Herbs, corms 2-3 cm across. Leaflets 8-10, 8-12 x 3-4 cm, oblanceolate, apex abruptly acuminate, base acute, sparsely hispid below, petiolulate; petiole to 35 cm long, 2-together. Peduncle usually shorter than the petiole. Spathe 8-12 cm long, green; limb ovate, acuminate, with white and purple streaks; tube 4-6 cm long. Spadix 12-18 cm long, sigmoidally curved, appendage narrow.

Flowering & Fruiting: May - June.

Utility: Used in Folk medicine.

Notes: Found in shady region of sholas ± 2200 m, occasional in Pykara.

PSU & NKK, Wenlockdowns, 10.05.1991, b 16 (Cairn Hills).

COLOCASIA Schott.

51. Colocasia esculenta (L.) Schott. in Schott. & Endl., Melet. Bot. 1: 18. 1832; P. Bargh. in A.N. Henry et al., Fl. Tamil Nadu 3: 56.1989. *Arum esculentum* L., Sp. Pl. 965. 1753. *Arum colocasia* L., Sp. Pl. 965. 1753. *Colocasia antiquorum* Schott in Schott & Endl., Melet. Bot. 1: 18. 1832; Hook. f., Fl. Brit. India 6: 523. 1893; Gamble, Fl. Pres. Madras 1580(1102). 1931. **(PLATE 6: 48)**

Common names: Wild taro (E); Chembu, Seppankizhangu, Kaattuchembu (M); Seppan-kilangu, Karunai-kilangu, Kattu-senai (T).

Distribution: Pantropical. *Habitat*: Marshy areas.

Herbs, rhizome stoloniferous. Leaves few to many, peltate, 20-28 x 10-18 cm, ovate, cordate to sagittate at base, glabrous; nerves 6 pairs, united to form an intramarginal vein; lowest pair with lateral nerves of the basal lobes, intercostae curved; petiole 30-45 cm long, cylindrical, smooth. Peduncle solitary or few together, 10-20 cm long, stout. Spathe to 20 cm long, yellow, lanceolate, constricted above the base; limb acuminate. Spadix 10 cm long, cylindrical, appendages terete, obtuse. Male flowers above, to 5-6 cm of the spadix, stamens 6. Female flowers on lower, 2 cm of the spadix; ovary 1-celled, ovules many on 2-4 parietal placentas. Neutral flowers many, peltate, between the female and male flowers. Fruit an aggregate of berries, globose.

Flowering & Fruiting: May - October.

Utility: Used in Ayurveda, Folk, Siddha and Unani systems of medicine. Rhizomes are used for internal haemorrhages, adenitis, somatalgia, congestion of the portial system, otalgia and general debility. Tender leaves are used for piles.

Notes: Found in stream banks, marshes etc. ± 2200 m, common in Pykara water falls.

ZANTEDESCHIA Spreng.

52. Zantedeschia aethiopica (L.) Spreng., Syst. Veg. 3: 765. 1826; P. Bargh. in A.N. Henry et al., Fl. Tamil Nadu 3: 59.1989. *Calla aethiopica* L., Sp. Pl. 968. 1753. **(PLATE 6: 49)**

Common names: Arum Lily (E).

Distribution: Native of South Africa. *Habitat*: Water logged areas.

Perrenial rhizomatous herbs with hypogaean stem. Petioles to 60 cm, sheath persistent, to 40 cm, ligulate and free for 1 cm, leaf-blade sagittate, anterior lobe to 35 x 18 cm, posterior lobes to 12 x 8 cm. Peduncles equaling petioles, erect and lifting inflorescence above the spreading leaves. Spathe to 15 x 15 cm, white, apiculate, funnel-form with revolute edges, broad-faced. Spadix to 8 cm, terete: female for 1-2 cm with green pistils intermixed along yellow staminodia, male for 6 cm, yellow. Perianth absent. Stamens 2 or 3. Ovary 3-5 celled. Berry ovoid; seeds subglobose.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Introduced as a garden plant, now found a run wild in Ooty boat house ± 2100 m, and other water logged areas.

8. ARALIACEAE

SCHEFFLERA J.R. & G. Forst.

1. Flowers sessile in heads; bracteoles 4 .... *S. capitata*
1. Flowers pedicellate umbels; bracteoles absent or few 2

2. Style combined into a prominent column, persistant in fruit as a beak .... *S. rostrata*
2. Style short or absent 3

3. Leaflets obtuse or rounded at apex .... *S. stellata*
3. Leaflets shortly acuminate at apex .... *S. racemosa*

53. Schefflera capitata (Wight & Arn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 36. 1894; Gamble, Fl. Pres. Madras 571(403). 1919; R. Rajan in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 182.1983. *Paratropia capitata* Wight & Arn., Prodr. 378. 1834. *Brassaia capitata* (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 732. 1879; Fyson, Fl. South Indian Hill St. 2: t. 131. 1932. **(PLATE 6: 50)**

Common names: Etilamaram (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small much-branched trees. Leaves alternate, palmately compound; leaflets 7-8, to 15 x 5 cm, coriaceous, glossy on the upper side, dull and light green on lower side;

midrib very stout, brown; leaf-base sheathing with a triangular intra-petiolar stipule, covering the axillary bud. Inflorescens a terminal panicle up to 35 cm long, dark purple. Flowers in dense sessile heads of 6 or 7, at the ends of the stout branches of the panicle; heads 1.5-2.5 cm wide, of about ten flowers. Bracts concave, tomentose. Petals 6, valvate. Stamens longer than the petals abruptly bent inwards just below the anther. Ovary bluntly conical, continuous with the disc at the base; 6-celled; styles fused in to a column. Fruits drupaceous, sub globose, 6-angled.

Flowering & Fruiting: February - May.

Notes: Found in sholas and evergreen forests ± 1900 m, common in Wood brooke.

PSU & NKK, Outcherloney, 02.02.1991, a 10 (Cairn Hills).

54. Schefflera racemosa (Wight) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 570(402). 1919; Fyson, Fl. South Indian Hill St. 3: t. 351. 1920; R. Rajan in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 182.1983. *Hedera racemosa* Wight, Ic. t. 1015. 1845. *Heptapleurum racemosum* (Wight) Bedd., Fl. Sylv. t. 214. 1872; Hook. f., Fl. Brit. India 2: 729. 1879. **(PLATE 6: 51)**

Common names: Charuka, Ettilamaram, Kappamaram, Kottathunikkan (M); Ettilemaram, Kanneemaram (T).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Medium sized trees; young parts rusty tomentose. Leaves digitately compound, alternate, stipulate; stipules adnate within the petiole; rachis 12-23 cm long, stout, sheathing at base, glabrous; leaflets 4-8; petiolule 2.5-5 cm long, slender, grooved above, glabrous; lamina 9.5-18 x 3.8-6 cm, elliptic or elliptic-lanceolate, base acute; apex acuminate, margin entire or wavy, glabrous, glaucous beneath, chartaceous. Flowers pale green, in paniculate racemes from stout older branches; bracts, bracteoles and pedicels rusty pubescent; bracts persistent. Calyx 5-toothed, obtuse. Petals 5, ovate, acute, valvate. Stamens as many as petals. Ovary cells as many as petals; styles 5, short, connate in a cylindric column, stigma distinct. Fruit a berry, 5-6 mm across, 5-celled, 5-angled, ovoid, glabrous with persistent style.

Flowering & Fruiting: March- April.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Pykara.

KNS, Benne RF, 13.02.1963, 130 (FRC).

55. **Schefflera rostrata** (Wight) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 569(402). 1919; R. Rajan in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 182.1983. *Hedera rostrata* Wight, Ic. tt. 1013,1014.1845, p.p. *Heptapleurum rostratum* (Wight) Bedd., For. Man. Bot. 122. 1874; Hook. f., Fl. Brit. India 2: 729. 1879. **(PLATE 6: 52)**

Common names: Pullumaram (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, 8-12 m high, sometimes epiphytic on trees or rocks. Leaves digitate, leaflets 7-11, 5-12 x 3-8 cm, oblong-lanceolate, acute at apex, round at base, rusty pubescent when young; petioles 10-20 cm long; petiolule 0.5-2.5 cm long, both rusty pubescent when young. Inflorescence at tip of old branches or axillary; umbels 2-2.5 cm diam. Peduncles 2-3 cm long; pedicels 0.5-1 cm long. Bracts 0.2-0.3 cm long, ovate, rusty pubescent when young. Flowers 0.4-0.5 cm across. Calyx tube 0.2-0.25 cm long, 0.25 cm diam., minutely 5-6 toothed. Petals 0.25-0.3 cm long, ovate, valvate. Filaments 0.5 cm long; anthers ca 0.1 cm long, introse. Ovary 0.4-0.5 cm long; style short, connate in into a cylindric column.

Flowering & Fruiting: March- June.

Notes: Found in the ecotone region of sholas ± 1820 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 28.01.1991, a 11 (Cairn Hills).

56. **Schefflera stellata** (Gaertn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 39.1894; Gamble, Fl. Pres. Madras 570(402). 1919; Fyson, Fl. South Indian Hill St. 3: t. 352. 1920; R. Rajan in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 183.1983. *Heptapleurum stellatum* Gaertn. Fruct. 2:472. t.178. 1791; Hook. f., Fl. Brit. India 2: 730. 1879. *Hedera obovata* Wight, Ic. t. 1011 & 1012. 1845. **(PLATE 6: 53)**

Common names: Kallu konda mavu (K); Kappamaram, Urumamkai, Uramkai (M).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Straggling shrubs. Leaves digitate; leaflets 3-5, 12 x 8 cm, obovate, apex emarginate or slightly obtuse; petiole 10-15 cm long, sheathing, petiolule to 5 cm. Panicles to 35 cm long; pedicels to 0.7 cm long. Calyx tube united with ovary forming a rim. Petals 7-8, 3 x 1.5 cm, triangular. Stamens 7-8, filaments 1.5 mm; anthers 1.5 mm. Ovary seated in the calyx cup, 7-8 celled. Drupe globose.

Flowering & Fruiting: April - July.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1900 m, common in Kodanad.

PSU & NKK, Kodanad, 22.03.1994, 22 (TNFDH); KNS, Burliar, 23.02.1977, 6618 (FRC).

9. ARECACEAE

PHOENIX L.

57. Phoenix loureiroi Kunth, Enum. Pl. 3: 257. 1841, var. **loureiroi,** P. Bargh. in A.N. Henry et al., Fl. Tamil Nadu 3: 53.1989. *Phoenix humilis* var. *hanceana* Becc., Malesia 3: 379 & 392. 1890. *Phoenix humilis* Royle ex Becc., Malesia 3: 373. 1890, nom. illeg. *Phoenix hanceana* var. *formosana* Becc., Philipp. J. Sci. 3: 339. 1908. *Phoenix hanceana* var. *philippines* Becc., Philipp. J. Sci. 3: 339. 1908. *Phoenix pusilla* Lour., Fl. Cochinch. 614. 1790, non Gaertn. 1788. **(PLATE 6: 54)**

Common names: Ichampullu, Chittinthal (M); Malai-eecham (T).

Distribution: India to South East Asia. *Habitat*: Grasslands.

Dioecious coarse bushy shrubs, to 2 m tall, densely covered with leaf sheaths. Leaves in a dense caudex, to 1 m long, 60-70 cm broad, pinnately compound; lower leaflets transformed into sharp spines; upper ones 4-8 together, 20-30 x 1 cm, linear-oblong, acuminate, folded. Spadix axillary, 20-30 cm across; branches spreading, to 18 cm long. Flowers sessile. Perianth biseriate, outer smaller, connate, cupular; inner ovate, valvate. Stamens 6, free. Ovary of 3 free carpels; ovules solitary; stigma uncinate. Drupes 12 x 8 mm, obovoid, yellow.

Flowering & Fruiting: Throughout the year.

Utility: Used in Ayurveda and Siddha systems of medicine. Fruits are useful in hyperdipsia, burning sensation, fever, cardiac debility, seminal weakness and gastropathy. Fruits are edible.

Notes: Found in grasslands ± 2150 m, common in Sispara.

PSU & NKK, Naduvattam, 08.02.1991, b 10 (Cairn Hills).

10. ASCLEPIADACEAE

1. Inflorescence an umbel, axillary .... ***Wattakaka***
1. Inflorescence other than an umbel **2**

2. Plant purplish with purple leaves and veins .... ***Decalepis***
2. Plants greenish or yellowish .... ***Gymnema***

BACOLEPIS Decne. ex Moq.

58. Decalepis nervosa (Wight & Arn.) Venter, Taxon. 46; 712. 1997. Bacolepis nervosa (Wight & Arn.) Decne. ex Moq. in DC. Prodr. 13 (2): 216. 849. *Brachylepsis nervosa* Wight & Arn. in Wight, Contrib. 64. 1834; Hook.f. Fl. Brit. India 4: 7. 1883; Gamble, Fl. Pres. Madras 2: 830 (581).1923; Fyson, Fl. South Indian Hill St. 3: t. 418. 1920; R. Sreenivas. in Henry et al., Fl. Tamil Nadu 2: 90.1987. **(PLATE 7: 55)**

Distribution: Endemic to the Western Ghats of Nilgiris. *Habitat*: Shola border.

Perennial twining herbs; stems branched, tomentose, terete; internodes slightly ridged, densely pubescent when young, less pubescent at age; bark greyish-yellow with pale lenticels. Leaves opposite, decussate, lamina 1.5 - 12 x 0.5 – 6 cm, elliptic-lanceolate, acute or acuminate at apex, acute or rounded at base, margin ciliate, pubescent, midrib and lateral veins violet, lateral veins 8 - 16 pairs; petioles terete, 0.5 - 2 cm long. Flowers axillary or terminal, in dichotomous cymes; peduncles vilous; bracts ovate; pedicels terete, 1-1.5 mm long, villous. Calyx five lobed, contorted, divided up to base, lobes 2 x 1.5 mm long, ovate, apex acute, margin villous. Corolla rotate, lobes five, ca 3 x 1 mm, ovate-oblong. Corona five, broad membranous, brown scales, 0.5 X 0.5 mm, ovate, apex acute with slightly bifid tip. Stamens five, 1 mm long. Fruits not collected.

Flowering & Fruiting: March - May.

Notes: This species is easily recognised by its greenish yellow with purplish brown flowers and pubescent leaves with violet petiole and nerves. Found in the ecotone region of sholas ± 1800 m, common in Naduvattam and Longwood.

PSU & NKK, Naduvattam, 06.02.1991, b 58 (Cairn Hills); PSU & NKK, Kodanad, 30.09.1994, 175, 178 (TNFDH); KNS, Naduvattam, 24.05.1972, 4380 (FRC).

GYMNEMA R. Br.

1. Plants glabrous; flowers creamy-white .... ***G. indicum***
1. Plants hirsute; flowers yellow .... ***G. hirsutum***

59. Gymnema hirsutum Wight & Arn. in Wight, Contrib. 44. 1834; Hook. f., Fl. Brit. India 4: 29. 1883; Gamble, Fl. Pres. Madras 839(590). 1923; Fyson, Fl. South Indian Hill St. 2: t. 190. 1932; R. Sreenivas. in Henry et al., Fl. Tamil Nadu 2: 85.1987. **(PLATE 7: 56)**

Distribution: India. *Habitat*: Shola forests.

Large woody twining shrubs, yellowish-brown pubescent. Leaves opposite, 4-7 x 3-4.5 cm, ovate to ovate-lanceolate, acute to slightly acuminate at apex, round to slightly cordate at base; lateral nerves 3-4 pairs. Flowers in axillary and lateral umbellate cymes; peduncle 0.5-0.8 cm long; pedicels slender, 0.2-0.4 cm long. Calyx 1 mm long; lobes 5, ovate, pubescent without. Corolla yellow, 2-2.5 mm across; lobes 5. Corona 1 mm long; lobes thick. Anthers 5, erect. Carpels 2, apocarpous; ovules many; styles free; stigma united, capitate. Follicles oblong-lanceolate, 5-7 cm long, 0.7 cm wide at base, tip pointed. Seeds ovate, 0.2 cm long with silky coma at apex.

Flowering & Fruiting: September - December.

Utility: Used in Folk medicine. Part used and uses are similar to *Gymnema sylvestre* (Retz) R. Br. ex Schult. Roots and leaves are used in headache, hydrocele, polyuria, leprosy, pruritus, poisoning, wounds, bronchial asthma, hepatosplenomegaly, cough, jaundice, constipation and intermittent fever. Plant has a temporary paralysing action on the sweet taste buds and used for diabetes.

Notes: Found in the ecotone region of sholas ± 1850 m, common in Thaishola.

KNS, Gudalur, 14.05.1963, 664 (FRC).

60. Gymnema indicum (M.A. Rahman & Wilcock) Karthik. & Moorthy in Karthik. et al., Fl. Pl. India 1: 170. 2009. *Bidaria indica* Rahman & Wilcock, Blumea 34: 99. 1989. *Gymnema montanum* (Roxb.) Hook. f. var. *beddomei* Hook. f., Fl. Brit. India 4: 32. 1883. *Gymnema montanum* (Roxb.) Hook. f. var. *pubiflora* Hook. f., Fl. Brit. India 4: 32. 1883; R. Sreenivas. in Henry et al., Fl. Tamil Nadu 2: 85.1987. **(PLATE 7: 57)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Glabrous twining shrubs. Leaves to 12 x 5 cm, elliptic-oblong, acuminate, base rounded; nerves 4-6 pairs; petiole 12 mm long. Flowers yellow, 5 x 8 mm, in 4 or 5-flowered axillary umbels; peduncle 12 mm long, stout, puberulus; pedicels to 8 mm

long; sepals to 4 x 1.9 mm, oblong, obtuse, pubescent; corolla tube 3.5 mm long, lobes 4 x 2.5 mm, obovate, retuse, pubescent outside, yellow; corona corolline, ridges tomentose; gynostegium 6 x 3 mm, cylindrical.

Flowering & Fruiting: April - May.

Notes: Found in the ecotone region of sholas ± 1820 m, common in Naduvattam.

WATTAKAKA Hassk.

61. Wattakaka volubilis (L. f.) Stapf, Bot. Mag. 148: sub t. 8976. 1923; R. Sreenivas. in Henry et al., Fl. Tamil Nadu 2: 90.1987. *Asclepias volubilis* L. f., Suppl. Pl. 170. 1781. *Marsdenia volubilis* (L. f.) Cooke, Fl. Pres. Bombay 2: 166. 1904; Gamble, Fl. Pres. Madras 846(595). 1923. *Hoya viridiflora* R. Br., Mem. Wern. Nat. Hist. Soc. 1: 27. 1811. *Dregea volubilis* (L.f.) Benth. ex Hook. f., Fl. Brit. India 4: 46. 1883; Fyson, Fl. South Indian Hill St. 3: t. 423. 1920. **(PLATE 7: 58)**

Common names: Sneeze Wort (E); Eggadaka balli, Kadahaale balli (K); Vattakakkakkoti, Kakkalankodi (M); Kurincha (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola border.

Climbing shrubs. Leaves ovate, 9 x 7 cm, glabrous, acuminate at apex, truncate or cordate at base; petioles ca 3 cm long; peduncles longer than the petioles. Flowers in axillary many-flowered umbellate cymes. Calyx 5-lobed; lobes imbricate. Corolla rotate, lobes imbricate; corona uniseriate. Anthers erect, connective produced into a membranous tip; pollen masses erect, solitary in each anther cell. Follicles 10 x 3 cm, ribbed, blunt at apex.

Flowering & Fruiting: March- May.

Utility: Used in Ayurveda and Siddha. Plant juice is used as a sternutatory, emetic, expectorant and in boils and abscess.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

PSU & NKK, Gudalur, 06.03.1991, II b 66 (Cairn Hills).

11. ASTERACEAE (COMPOSITAE)

Flowers all tubular or the outer only ligulate; sap watery .... **Series I. Tubuliflorae**

Tribe 1. Vernonieae

Heads homogamous; flowers all bisexual, tubular, never yellow; anther cleft at the base, not tailed; style arms subulate, hairy; pappus setose paleaceous or absent; leaves usually alternate .... ***Vernonia***

Tribe 2. Eupatorieae

Heads homogamous; flowers all bisexual, tubular, rarely orange, never yellow; anthers subentire at the base; style arm obtuse, papillose; pappus usually setose; leaves opposite or alternate.

1. Panicle lax, cymose; pappus of subulate hairs much shorter than corolla-tube; anther tip truncate; achene curved, verrucose .... ***Adenostemma***
1. Panicle dense, corymbose; pappus of scales or hairs, as long as corolla-tube; anther tip produced; achene straight, ribbed or angled **2**

2. Phyllaries multi-seriate; receptacle epaleaceous; achenes angled; pappus hairs filiform, barbellate .... ***Ageratina***
2. Phyllaries biseriate; receptacle paleaceous; achenes ribbed; pappus scales 5, paleaceous, broadened below .... ***Ageratum***

Tribe 3. Astereae

Heads heterogamous; rayed or discoid or homogamous and rayless; flowers of disc usually yellow, of ray variously coloured; anthers subentire at base; style arms flattended or plano-convex; pappus usually thinly setose; leaves usually alternate

1. Capitula disciform, or with inconspicuous florets hardly longer than involucre **2**
1. Capitula distinctly radiate, ligules clearly longer than involucre **3**

2. Leaves neither lobed or pinnatifid, entire or serrate; pappus capillary; female florets tubular or with a short ligule .... ***Conyza***
2. Leaves pinnatifid; pappus absent or cupulate, or of 2 weak bristles; female florets tubular, eligulate .... ***Dichrocephala***

3. Pappus zero; stem leafy; achenes with a glandular rostrum at apex .... ***Myriactis***
3. Pappus of fine hairs .... ***Erigeron***

Tribe 4. Inuleae

Heads heterogamous; rayed or discoid or homogamous and rayless; flowers of disc and rays usually yellow, of ray variously coloured; anther bases tailed; style arms linear obtuse or styles of sterile flowers undivided; leaves alternate.

1. Phyllaries papery or apically scarious; plants covered with whitish araneose tomentum 2
1. Phyllaries herbaceous or cartilaginous; plants gibbous or varyingly pubescent, sometimes lanate, but not araneose, tomentose .... *Blumea*

2. Female florets numerous; bisexual a few less than 10; involucre scarious, yellow or straw-coloured ....*Gamochaeta*
2. Female florets generally fewer than bisexual and involucre papery 3

3. Phyllaries ovate-acute, spreading; involucre white or pinkish ....*Anaphalis*
3. Phyllaries spathulate, obtuse, not spreading; involucre yellow or white ....*Helichrysum*

Tribe 5. Heliantheae

Heads heterogamous usually rayed or homogamous, not rayed; flowers usually yellow; receptacle paleaceous; anther bases not tailed; style arms truncate or appendiculate, or of sterile flowers entire; pappus of 2-4 bristles or paleaceous or absent; leaves opposite.

1. Ray achenes alone fertile; pappus absent or of 2 minute hairs.....................................*Moonia*
1. Disc achenes fertile; pappus of 1-4 bristly awans...2

2. Disc achenes rounded or laterally compressed 3
2. Disc achenes dorsally compressed or angular and hardly compressed 4

3. Outer bracts of involucres clavate, spreading and conspicuously glandular ....*Sigesbeckia*
3. Outer bracts of involucres erect, if spreading not conspicuously glandular ....*Acmella*

4. Pappus zero or consisting of 2-3 bristles or awns 5
4. Pappus consisting of about 10 bristles or scales ....*Galinsoga*

5. Achenes compressed ....*Dahlia*
5. Achenes fusiform or angular ....*Bidens*

Tribe 6. Anthemideae

Heads heterogamous, rayed or discoid or homogamous and rayless; flowers of various colours; receptacle naked or paleaceous; anther bases not tailed; style arms truncate; pappus zero or a crown of short paleae; flower heads discoid, heterogamous.

1. Low prostrate herbs; head solitary; capitula globose ....*Cotula*
1. Subshrubs; heads in raceme or panicle; capitula campanulate ....*Artemisia*

Tribe 7. Senecioneae

Heads heterogamous, rayed or discoid or homogamous, not rayed; disc flowers yellow or red; ray flowers also usually yellow; receptacle usually naked; anther bases obtuse, rarely tailed.

1. Anther bases with sterile tailed auricles; petiole basally thickened, prehensile; climbers ....*Cissampelopsis*
1. Anther bases without tailed auricles 2

2. Involucre of capitula without basal bracteoles .... *Emilia*
2. Involucre of capitula with basal bracteoles; marginal female florets radiate or absent 3

3. Style arms erect, with elongate, subulate papillose appendages 4
3. Style arms recurving, appendages zero 5

4. Leaves entire; style arms ovate; pappus barbellate; involucres more than 1.5 cm long.... *Kleinia*
4. Leaves coarsely serrate; style arms tapering to an acute point; pappus smooth; involucre less than1 cm long .... *Gynura*

5. Capitula heterogamous, rayed; apex of style- arms with out a central appendage of fused papillae .... *Senecio*
5. Capitula homogamous, rays zero; apex of style- arms with a central appendage of fused papillae .... *Crassocephalum*

Tribe 8. Cardueae

Heads homogamous, discoid, armed; receptacle hairy, sometimes naked; anther bases caudate; styles slightly swollen below, the 2 short arms; pappus capillary.

Capitula many- flowered, creamy, separate; stout subshrubs, more than 2 m .... *Cirsium*

Flowers all ligulate, juice milky .... **Series II. Liguliflorae**

Tribe 9. Cichorieae

Heads homogamous, involucral bracts membranous, usually 1-2 seriate; receptacle naked or paleaceous; anther bases sagittate, rarely tailed; styles arms slender; pappus setose, paleaceous or zero; leaves always radical, opposite, not alternate.

1. Pappus hairs, feathery; achenes transversely barred between ribs.. 2
1. Pappus hairs, simple; receptacle epaleaceous 3

2. Receptacle epaleaceous, hispid, leafy herbs; achenes narrow, pointed at both ends, not beaked .... *Picris*
2. Receptacle paleaceous, glabrous, scapigerous herbs; achenes of 2 kinds; outer truncate, inner long-beaked .... *Hypochoeris*

3. Capitula solitary on leafless scapes; achenes tuberculate above, rostrate .... *Taraxacum*
3. Capitula several on branching leafy stems; achenes not tuberculate above 4

4. Achenes beaked, narrow at both ends; anthers fusiform or oblong with stout beak ...... *Youngia*
4. Anthers not beaked; pappus white, soft, silky .... *Launaea*

ACMELLA L.C. Richard ex Person

62. Acmella calva (DC.) R.K. Jansen, Syst. Bot. Monogr. 8: 41. 1985. *Spilanthes calva* DC. in Wight, Contrib. 19. 1834; V. Chandras. in Henry et al., Fl. Tamil

Nadu 2: 50.1987. *Spilanthes acmella* var. *calva* (DC.) Clarke, Comp. Ind. 138. 1876. *Spilanthes acmella* sensu Hook.f., Fl. Brit. India 3: 307. 1881, non (L.) Murr. 1844; Gamble, Fl. Pres. Madras 708(498). 1921; Fyson, Fl. South Indian Hill St. 3: t. 389. 1920. **(PLATE 7: 59)**

Common names: Toothache plant (E); Vana muguli (K); Eripacha, Kuppamanjal, Palluvedanachedi, Tharippuchedi (M).

Distribution: Indo-Malesia and China. *Habitat*: Shola border.

Procumbent scabrid herbs. Leaves to 4 x 2.5 cm, ovate, base truncate, apex acute, chartaceous. Heads 10 x 7 mm, solitary, conical. Flowers bisexual; corolla yellow, 2.5 mm long, tubular, campanulate above; lobes 0.5 mm long, ovate, acute, glabrous. Achenes 2 x 1 mm, obovate, biconvex, dark brown, glandular.

Flowering & Fruiting: February - April.

Utility: Used in Folk medicine. Pungent flowers are chewed for relief in throat affections and paralysis of tongue; also used in stammering of children. Decoction is used in scabies, psoriasis and dysentery.

Notes: Found in the moist ground of shola borders ± 1800 m, common in Naduvattam.

PSU & NKK, Parson's valley, 26.01.1991, b 12 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 242 (TNFDH); KNS, Nirgcimund shola, 13.05.1963, 272 (FRC).

ADENOSTEMMA J.R. & G. Forst.

63. Adenostemma lavenia (L.) O. Ktze., Rev. Gen. Pl. 1:304. 1891, var. **lavenia**; Gamble, Fl. Pres. Madras 677(476). 1921; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 28. 1987; Uniyal in Hajra et al., Fl. India 12: 346. 1995. *Verbesina lavenia* L., Sp. Pl. 902. 1753. *Adenostemma latifolium* D. Don, Prodr. Fl. Nepal. 181. 1825. *Adenostemma viscosum* J.R. & G. Forst., Char. Gen. 90. t. 45. 1776; Fyson, Fl. South Indian Hill St. 3: 69. 1932. *Adenostemma viscosum* J.R. & G. Forst. var. *lavenia* Hook. f., Fl. Brit. India 3: 242. 1881, p.p. **(PLATE 7: 60)**

Distribution: Paleotropics. *Habitat*: Shola border.

Erect annual branched herbs to 60 cm tall. Leaves variable, lower opposite and upper often alternate, to 15 x 7 cm, oblong or oblong-lanceolate, subacute, base cuneate, coarsely serrate; 3-nerved from base; petiole to 1.5 cm long. Heads in few to many in panicles, 6-7 mm across; bract linear. Involucral phyllaries linear-oblong, obtuse or

subacute, glabrous. Corolla tube short, glandular hairy and viscous, lobes 5, acute. Style twice the length of the corolla, much exserted. Achenes 4-5 mm long, 5-angled, obtuse, nearly smooth, papus of 4 or 5 glandular setae.

Flowering & Fruiting: October - December.

Notes: Found in the shola floor ± 1800 m, common in Naduvattam.

AGERATINA Spach.

64. Ageratina adenophora (Spreng.) King & Robins., Phytologia 19: 211. 1970; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 29.1987. *Eupatorium adenophorum* Spreng., Syst. Veg. 3: 420. 1826; Uniyal in Hajra et al., Fl. India 12: 350. 1995. *Eupatorium glandulosum* Kunth, Nov. Gen. Sp. 4: 122, t. 346. 1820, non Michx. 1803. **(PLATE 7: 61)**

Common names: Sticky snakeroot, Crofton weed (E); Congress gida (K); Neelagiri, Thravada (M).

Distribution: Originally from South America. *Habitat*: Shola border.

Subshrubs, glandular hairy, stem violet-blue. Leaves 5-8 x 2-4 cm, ovate, apex acute, serrate; petiole 2 cm long. Heads 7 mm across, 5 mm long, packed, in terminal corymbose panicle; bracts 3-seriate, 4 x 1 mm, lanceolate, strongly 3-ribbed. Outer florets bisexual; corolla white, 5-lobed, hispid. Inner florets female. Achenes 2 mm long, curved, ellipsoid, 5-angled, brown, smooth; pappus 5-10, 4 mm long, white, barbed.

Flowering & Fruiting: February - June.

Utility: Used in Folk medicine. Leaf juice is applied externally on cuts and wounds to stop bleeding.

Notes: Naturalised in the open areas of shola forests ± 2150 m, common in Pykara.

PSU & NKK, Pykara, 30.01.1991, II a 73 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1994, 165 (TNFDH); KNS, Peria shola, 21.03.1968, 3346 (FRC).

AGERATUM L.

65. Ageratum houstonianum Mill., Gard. Dict. (ed. 8) n. 2. 1768; Koster, Blumea 1: 490. 1935; Gamble, Fl. Pres. Madras 1881(1302). 1936; V. Chandras. in

Henry et al., Fl. Tamil Nadu 2: 29.1987; Uniyal in Hajra et al., Fl. India 12: 349. 1995. **(PLATE 7: 62)**

Common names: Floss flower (E); Kammunist (K); Kaliyamman-pathiri, Michangala, Neela appa (M); Pumppillu (T).

Distribution: Native of Tropical America; now naturalised in Tropical Asia. *Habitat*: Roadsides and open areas.

Herbs, viscid hairy. Leaves 5-7 x 3-5 cm, ovate, apex acute, crenate, base rounded; petiole 1-3 cm long. Heads white, to 7 mm across, in terminal corymbose panicle; bracts 1-3-seriate, 3-4 mm long, elliptic, toothed at apex, 3-ribbed. Flowers all similar, bisexual; corolla 2.5 mm long, tubular, white, glabrous, 5-lobed at apex; stamens 5, anthers linear. Achenes 2 mm long, linear, 5-angled, hirsute along the angles; pappus 3-4 mm long, many, setaceous.

Flowering & Fruiting: February - May.

Utility: Used in Folk medicine. Whole plant is used as a nervine tonic. Decoction or infusion of whole plant is used in diarrhoea, dysentery, colic with flatulence and other gastro-intestinal ailments. Leaves are styptic and vulnerary and arre useful in haemorrhoids, wounds and sores.

Notes: Weed of fallow ground, arable lands, roadsides and open areas along the sholas ± 2150 m, common in Pykara.

PSU & NKK, Naduvattam, 06.02.1991, L b 12 (Cairn Hills); KNS, Bandy shola, 10.05.1963, 554 (FRC).

ANAPHALIS A. DC.

1. Leaves 3 or 5-ribbed from base, more than 1 cm wide; subshrubs, more than 1 m tall **2**
1. Leaves 1-ribbed from base, less than 6 mm wide; herbs, less than 1 m tall **3**

2. Leaves 5-ribbed, base semi-amplexicaul, tomentose, thin; capitula 4 mm wide ......***A. beddomei***
2. Leaves 3-ribbed, base not amplexicaul, cottony on either side, thick; capitula 8 mm wide ....***A. travancorica***

3. Leaves less than 2 cm long, crowded; stem profusely branched **4**
3. Leaves more than 2.5 cm long, not crowded; stem sparingly branched **6**

4. Capitula yellow .... ***A. meeboldii***
4. Capitula white **5**

5. Branches slender, flowering ones about 35 cm long .... ***A. bournei***
5. Branches thick, flowering once about 25 cm long .... ***A. neelgerryana***

6. Leaf margin folded back **7**
6. Leaf margin not folded back .... ***A. subdecurrens***

7. Achenes papilose .... ***A. marcescens***
7. Achenes scaly **8**

8. Capitula white, 3 mm wide, few flowered; leaves scented, base broad, tapering towards apex .... ***A. aristata***
8. Capitula pink, 6 mm wide, many-flowered, leaves highly scented, base narrow, apically rounded .... ***A. wightiana***

66. Anaphalis aristata DC., Prodr. 6: 274. 1838; Hook. f., Fl. Brit. India 3: 285. 1881; Gamble, Fl. Pres. Madras 696(489). 1921; Fyson, Fl. South Indian Hill St. 2: t. 163. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 29.1987; P.C. Pant in Hajra et al., Fl. India 13: 55. 1995. **(PLATE 7: 63)**

Common names: Panjichedi (M).

Distribution: Peninsular India. *Habitat*: Grasslands.

Slender annual herbs; younger stems cottony woolly. Leaves 2-4 x 0.3 cm, narrowed from a broad amplexicaule or cordate base, acuminate at apex, 1-nerved, scabrous above. Heads 3 x 3 mm, hemispherical, collected in terminal dense clusters; bracts 4 mm long, spreading, elliptic, acute, woolly, solid at base. Bisexual flowers central, 5 or 6; corolla 2.5 mm long, broader above. Female flowers many; corolla 1.5 mm long, slender. Achenes cylindrical, brown, papillose; pappus 2 mm long, white.

Flowering & Fruiting: July - April.

Notes: Found in the ecotone region of sholas ± 1900 m, common in Emerald.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 47 (Cairn Hills); PSU & NKK, Kodanad, 13.10.1995, 348 (TNFDH); MPRR, Ootacamund, 16.10.1929, 21042 (FRC).

67. Anaphalis beddomei Hook.f., Fl. Brit. India 3: 282. 1881; Gamble, Fl. Pres. Madras 695(489). 1921; Fyson, Fl. South Indian Hill St. 2: t. 160. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 29.1987; P.C. Pant in Hajra et al., Fl. India 13: 55. 1995. **(PLATE 8: 64)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Along stream sides in grasslands.

Stout, subshrubs. Leaves elliptic to lanceolate, 10 x 2 cm, chartaceous, densely woolly, prominently 5-ribbed, base narrow, semi-amplexicaul, apex acute. Corymbs to 13 cm wide; peduncle to 6 cm. Capitula white with yellow centre, 4 mm wide; stalk 3 mm; receptacle less than 2 mm wide. Phyllaries 3-5-seriate, white; outer ones oblong-elliptic, 4 mm; inner ones oblong-lanceolate, 3.5 mm. Pappus 15-20, bristly, 2.5 mm long. Bisexual florets 15-20 in 3 or 4-seriate. Corolla yellowish, glanded; tube 2 mm; lobes 5. Stamens 5. Style arms distally thickened. Pistillate florets 20-25 in 2 or 3-series. Corolla tube 2 mm; lobes 5. Achenes less than 1 mm, faintly ribbed, spinulose.

Flowering & Fruiting: June - October.

Notes: Found in the stream banks of sholas and grasslands ± 2100 m, common in Bangitapal.

68. Anaphalis bournei Fyson, Bull. Misc. Inform. Kew 1914: 209. 1914; Gamble, Fl. Pres. Madras 697(490). 1921; Fyson, Fl. South Indian Hill St. 2: t. 165. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 29.1987; P.C. Pant in Hajra et al., Fl. India 13: 56. 1995. **(PLATE 8: 65)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Branched herbs; branchlets slender, white fluffy, old leaves clustered at base. Leaves linear to (ob)lanceolate, 1.5 x 0.4 cm, adpressed woolly, 1-nerved, base attenuate and decurrent, apex acute. Corymbs terminal, to 3 cm wide, with upto 20 capitula; peduncle to 2 cm. Capitula heterogamous, white, 5 mm wide; stalk 1.2 cm; receptacle less than 3 mm wide. Phyllaries 3-seriate, white; outer ones ovate-oblong, 3.5 mm, sub-acute; inner ones oblong-lanceolate, 4 mm, obtuse. Pappus 15-20, 3 mm long. Bisexual florets 30-40 in 3-or 4-series. Corolla tube 3 mm; lobes 5. Stamens 5. Style 3 mm, (sub)exserted. Pistillate florets 10-20 in 2-or 3-series. Corolla-tube 2.5 mm; teeth 5. Style 3 mm, exserted. Achene ovoid, 3-4 angled, scaly.

Flowering & Fruiting: July - December.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Western Catchment.

69. Anaphalis marcescens (Wight) Clarke, Comp. Ind. 110.1876; Hook. f., Fl. Brit. India 3:286.1881; Gamble, Fl. Pres. Madras 696(489). 1921; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 30.1987; P.C. Pant in Hajra et al., Fl. India 13:67.1995. *Gnaphalium marcescens* Wight, Ic. t. 1115. 1856. **(PLATE 8: 66)**

Distribution: South India and Sri Lanka. *Habitat*: Banks of streams on wet rocks.

Herbs, slender, branched and woody, upto 45 cm high; stems and undersurface of leaves clothed with white cottony pubescence. Leaves spreading or reflexed, sessile, 1-nerved, adnate to stem, linear, slightly dilated at base, acute at apex, margins recurved, 0.8-3 x 0.1-0.4 cm, upper surface glabrous, lower surface fulvous cottony tomentose, Heads in dense, rounded, terminal, subcorymbose clusters, ca 4 mm across; peduncle ca 3 mm long, densely clothed with rusty brown wool. Involucral bracts white, 3-4-seriate, marcescent; outermost obovate-oblong, brownish at base, covered with rusty brown tomentum; inner lanceolate-oblong, brownish at basal end. Ray florets female with filiform corolla, ca 2 mm long, 4-toothed; lobes glandular. Achenes ca 0.5 mm long, hairy. Pappus hairs white, minutely bristly.

Flowering & Fruiting: July - January.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Sispara.

70. Anaphalis meeboldii W. W. Smith, Rec. Bot. Surv. Ind. 4: 284. 1911; Gamble, Fl. Pres. Madras 696(490). 1921; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 30.1987; P.C. Pant in Hajra et al., Fl. India 13: 69. 1995. **(PLATE 8: 67)**

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Tufted, compact herbs; branchlets woolly, ascending, striate; tender parts densely white cottony, interspersed with long pilose hairs. Leaves alternate, lanceolate, to 1.8 x 0.3 cm, 1-nerved, base decurrent, margin reflexed, apex acuminate, woolly and ascending when young, glabrescent and deflexed with age. Corymbs terminal, to 2 cm wide, rounded, heterogamous, disciform. Capitulum 5.5 mm wide, yellow. Involucre 4-or 5-seriate. Phyllaries oblong-spathulate, to 3.5 x 1 mm, imbricate, thickened below, scarious above, whitish. Receptacle naked. Pappus 1.5 mm. Pistillate florets 7-18. Corolla yellow, 2.2 mm, 4-lobed. Style 2.3 mm. Bisexual florets 17-25. Corolla 2.4 mm, 4-or 5-lobed. Stamens 1.6 mm. Style 2.2 mm.

Flowering & Fruiting: November - March.

Notes: Found in the open, exposed grasslands ± 2200 m, common in Porthimund.

71. Anaphalis neelgerryana (Sch.-Bip. ex DC.) DC., Prodr. 6: 272. 1838; Hook. f., Fl. Brit. India 3: 287. 1881; Gamble, Fl. Pres. Madras 697(490). 1921; Fyson, Fl. South Indian Hill St. 2: t. 166. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 30. 1987; P.C. Pant in Hajra et al., Fl. India 13: 69. 1995. *Gnaphalium neelgerryanum* Sch.-Bip. ex DC. in Wight, Contrib. 21. 1834. **(PLATE 8: 68)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Perennial erect herbs, ca 25 cm high, with woody root-stock; branches many, slender, whole plant clothed with white cottony tomentum. Leaves linear, base rounded and adhering to stem, acute at apex, margins recurved, 0.2-1 x 0.1-0.3 cm, surfaces densely white woolly, 1-nerved, sessile. Heads densely crowded or solitary or in corymbose clusters, ca 0.3 cm across; peduncle ca 3 mm long, densely white woolly tomentose. Involucral bracts 4-5-seriate; outermost brown, ovate-elliptic, enveloped in woolly tomentum; inner bracts glistening white with brownish or darker base, oblanceolate. Ray florets with filiform corolla, ca 1.8 mm long, obscurely toothed. Corolla of disc florets tubular, ca 2 mm long, 5 or more toothed. Achenes ca 0.4 mm long, terete, minutely papillose. Pappus hairs white, minutely plumose.

Flowering & Fruiting: July - October.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Ankinda.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 48 (Cairn Hills); KNS, Kokuthurai, 12.05.1963, 744 (FRC).

72. Anaphalis subdecurrens (DC.) Gamble, Fl. Pres. Madras 695(489). 1921; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 30.1987; P.C. Pant in Hajra et al., Fl. India 13: 75. 1995. *Gnaphalium subdecurrens* DC. in Wight, Contrib. 21. 1834. *Anaphalis oblonga* DC., Prodr. 6: 274. 1838; Hook. f., Fl. Brit. India 3: 283. 1881. **(PLATE 8: 69)**

Distribution: India and Sri Lanka. *Habitat*: Grasslands.

Erect herbs; stems densely covered with smoky wool. Leaves 3-6 x 0.6-1 cm, oblanceolate, acute, 1-veined, sessile. Heads 3 x 6 mm, sessile, collected in terminal congested cymes; bracts 3 mm long, elliptic, entire, acute with solid lower portion; outer ones woolly. Female flowers many; corolla yellow, slender, glabrous. Bisexual flowers 4-6, central; corolla broader. Achenes brown, papillose. Pappus 2 mm long, white.

Flowering & Fruiting: July - March.

Notes: Found in the ecotone region of sholas ± 2250 m, common in Mukurthi.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 49 (Cairn Hills); PSU & NKK, Kodanad, 02.09.1994, 156 (TNFDH).

73. Anaphalis travancorica W. W. Smith, Rec. Bot. Surv. Ind. 4: 284. 1911; Gamble, Fl. Pres. Madras 695(489). 1921; Fyson, Fl. South Indian Hill St. 2: t. 161. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 30. 1987; P.C. Pant in Hajra et al., Fl. India 13: 76. 1995. **(PLATE 8: 70)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Erect herbs. Leaves 5-6 x 1 cm, elliptic to oblanceolate, apex acute, dense woolly. Heads 6 mm across, white with yellowish centre, collected in terminal corymbs. Bisexual flowers plenty, central; corolla broader. Female flowers 30-40; corolla tube 3 mm, slender, glabrous. Achenes 1 mm, brown, papillose. Pappus 3 mm long.

Flowering & Fruiting: September - February.

Notes: Found in the ecotone region of sholas ± 2180 m, common in Governor shola.

74. Anaphalis wightiana (DC.) DC., Prodr. 6: 273. 1838; Hook. f., Fl. Brit. India 3:286.1881; Gamble, Fl. Pres. Madras 696(490). 1921; Fyson, Fl. South Indian Hill St. 2: t. 164. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 31.1987; P.C. Pant in Hajra et al., Fl. India 13: 81. 1995. *Gnaphalium wightianum* DC. in Wight, Contrib. 21. 1834. **(PLATE 8: 71)**

Distribution: Peninsular India. *Habitat*: Shola border.

Branched herbs; branches several, ascending. Leaves linear-spathulate, to 5 x 0.6 cm, crispately scabrous above, cottony and glaucous below, 1-nerved, base narrow, semi-amplexicaul, margin recurved, apically rounded, hardly scented. Cymes 3 cm wide, terminal, compact; peduncle to 5 cm. Capitula pink, 6 mm wide; stalk 3 mm; receptacle 2 mm wide. Phyllaries pink; outer ones ovate-oblong, 3.5 mm, apex acute; inner ones oblong-(ob)lanceolate, 4.5 mm, apex obtuse. Pappus 10-15, 2.5 mm long. Bisexual florets 10-15 in 2-or 3-series. Corolla-tube 2.5 mm; lobes 5. Stamens 5. Style 2.5 mm, included. Pistillate florets 50-70 in 5-or 6-series. Corolla-tube 2.5 mm; teeth 5. Style 2 mm, (sub) exserted or included. Achene 1 mm, papillose.

Flowering & Fruiting: September - June.

Notes: Found in open places, especially low-lying marshy grounds of sholas ± 2200 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, a 51 (Cairn Hills); PSU & NKK, Kodanad, 11.09.1995, 318 (TNFDH); MPRR, Ootacamund, 00.10.1929, 21041 (FRC).

ARTEMISIA L.

75. Artemisia nilagarica (Clarke) Pamp., Nuovo. Giorn. Bot. Ital. 33:452.1926; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 31.1987; B.D. Naithani in Hajra et al., Fl. India 12: 36. 1995. *Artemisia vulgaris* L. var. *nilagirica* Clarke, Comp. Ind. 162. 1876. *Artemisia indica* sensu Wight, Ic. t. 112. 1846. non Willd. 1803. *Artemisia vulgaris* sensu Hook. f., Fl. Brit. India 3: 325.1881, non L.; Gamble, Fl. Pres. Madras 713 (502).1921. **(PLATE 8: 72)**

Common names: Flea bane, Indian wormwood, Mugwort (E); Manjipatre (K); Karpoora-thulasi, Maasippathri, Makkippoovu, Tirunitripachcha, Velipathiri (M); Machipatri, Marikolundhu (T).

Distribution: India and South West China. *Habitat*: Planted as a live fence.

Perennial fragrant shrubs; stems terete, puberulus. Leaves to 20 x 10 cm; lobes oblong, acute; upper ones entire. Panicle axillary and terminal, leafy. Heads 3-4 mm long, globose; bracts 2.5 mm long, ovate-oblong, softly woolly, ciliate. Female flowers many; corolla 1.5 mm long, white, narrow. Bisexual flowers 4-6; corolla 2.5 mm long, broader, glabrous, connective of anthers mucronate. Achene 1.5 mm long, oblong, glabrous.

Flowering & Fruiting: May - December.

Utility: Used in Ayurveda and Folk systems of medicine. The plant is used as a febrifuge and as an inferior substitute for Cinchona in fevers. A weak decoction is used in fermentation given in skin diseases and ulcers. An infusion of the leaves and flowering tops are astringent, depurative, diuretic, emmenagouge, aphrodisiac, appetizer, digestive, stomachic, anthelmintic, febrifuge, deobstruent, alexeteric and haematinic. They are useful in cough, asthma, bronchitis, cephalalgia, nervous and spasmodic affections, inflammations, leprosy, skin diseases, pruritus, strangury, amenorrhoea, dysmenorrhoea, anorexia, dyspepsia, flatulence, colic, intestinal worms, fever, hysteria, measles, anaemia and asthma. The leaves are used for burning sensation in conjunctivitis. Roots are used as tonic and antiseptic.

Notes: Naturalised in the shola borders ± 2200 m, common in Pykara.

PSU & NKK, Mukurthi, 13.02.1991, a 55 (Cairn Hills); PSU & NKK, Kodanad, 04.11.1994, 225 (TNFDH).

BIDENS L.

76. **Bidens pilosa** L. var. **minor** (Blume) Sherff, Bot. Gaz. 80: 387. 1925; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 31.1987; H.J. Chowdhery in Hajra et al., Fl. India 12: 373. 1995. *Bidens sundaica* var. *minor* Blume, Bijdr. 914. 1826. *Bidens pilosa* sensu Hook. f., Fl. Brit. India 3: 309. 1881; Gamble, Fl. Pres. Madras 709(499). 1921; Fyson, Fl. South Indian Hill St. 2: t. 169. 1932, p.p. non L. 1753. **(PLATE 9: 73)**

Common names: Hairy beggarticks (E); Kithachedi, Snehakoora (M).

Distribution: Pantropical. *Habitat*: Cultivated fields.

Herbs, stem quadrangular. Leaves opposite, 12-18 cm, pinnate; lobes to 6 x 3 cm, ovate-lanceolate, apex acute, base truncate, serrate, hairy. Heads to 1 cm across; peduncles to 8 cm, flexuous; involucral bracts biseriate, outer ca 3 x 1 mm, linear, spathulate, inner to 5 x 2 mm, ovate, obtuse. Rays 2-5, corolla bilobed, yellow; disc many. Achenes ca 2.5 mm, setae 2-4, ca 3 mm long.

Flowering & Fruiting: March - October.

Utility: Used in Folk medicine. Leaf paste is applied on cuts and wounds.

Notes: Weed of cultivation, seen in fallow fields, way side ± 2100 m, common in Pykara.

PSU & NKK, Kundha, 18.02.1991, a 57 (Cairn Hills); PSU & NKK, Kodanad, 20.10.1993, 205 (TNFDH).

BLUMEA DC. *nom.cons.*

77. **Blumea axillaris** (Lam.) DC., Prodr. 5: 434. 1836. *Conyza axillaris* Lam., Encycl. 2: 84. 1812. *Erigeron molle* D. Don, Prodr. Fl. Nepal. 172. 1825. *Blumea wightiana* DC. in Wight, Contrib. 14.1834; Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686(483). 1921. *Blumea neilgherrensis* Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686(483). 1921; Fyson, Fl. South Indian Hill St. 3: t. 382. 1932. *Blumea mollis* (D. Don) Merr., Philipp. J. Sci. 5: 395.

1910; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 34. 1987; S. Kumar in Hajra et al., Fl. India 13: 135.1995. **(PLATE 9: 74)**

Distribution: Indo-Malesia to Australia and Africa. *Habitat*: Degraded forests and grasslands.

Herbs; stems strigose. Leaves to 5 x 3 cm, obovate, obtuse, glandular serrate, covered with simple and glandular hairs, nearly sessile. Heads 5 x 6 mm, in axillary and terminal thyrsiform clusters; peduncle strigose; bracts 5 mm long, linear, hairy; outer smaller. Bisexual flowers around 10, central; corolla 3 mm long, glandular. Female flowers many; corolla slender. Achenes ellipsoid, ribbed, hairy; pappus 3 mm long.

Flowering & Fruiting: January - November.

Utility: Used in Folk medicine.

Notes: Found in the open areas and along roadsides ± 1800 m, common in Kalhatti.

PSU & NKK, Muurthi, 02.02.1991, b 13 (Cairn Hills).

CIRSIUM P. Mill.

78. **Cirsium wallichii** DC., Prodr. 6: 643. 1838, var. **wightii** (Hook. f.) Vivek., Biol. Mem. Angiosp. Taxon ser. 2 (1 & 2): 77. 1977; Chandras. in Henry et al., Fl. Tamil Nadu 2: 36.1987. *Cnicus wallichii* DC. var. *wightii* Hook. f., Fl. Brit. India 3: 364. 1881; Fyson, Fl. South Indian Hill St. 3: t. 400. 1920. *Cnicus wallichii* DC. var. *fasciculata* Hook. f., Fl. Brit. India 3: 364. 1881. **(PLATE 9: 75)**

Common names: Chakkumullu (M).

Distribution: India, Nepal and Bhutan. *Habitat*: Roadsides.

Erect thistle subshrubs; branchlets ribbed, cottony herbs. Leaves alternate, sessile, clasping, lower ones deeply pinnatisect, upper ones sinuate-pinnatifid, to 10 x 3 cm; segments irregularly lobed and toothed, margin spiny. Corymbs terminal or in upper axils. Capitula many-flowered, separate, homogamous, bisexual, fertile, 4.5 cm wide. Involucre ovoid. Phyllaries several-seriate; outer ones spiny, spreading, 1.2 cm; inner ones dilated and incurved near apex, 1.5 cm. Receptacle 2 cm wide, flat; peduncle 1 cm. Florets to 2 cm. Corolla-tube 1.5 cm; lobes 5. Stamens 5; anther-base caudate, auricles connate, tails slender. Style arms short, obtuse. Achenes ovoid, obtusely 4-angled. Pappus of 15-40 whitish hairs to 1 cm, copious, feathery.

Flowering & Fruiting: October - April.

Utility: Used in Folk medicine.

Notes: Found in low-lying marsh, fallow ground and degraded slopes ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 21.02.1991, II a 62 (Cairn Hills).

CISSAMPELOPSIS (DC.) Miq.

79. Cissampelopsis corymbosa (Wall. ex DC.) Jeffrey & Chen., Kew Bull. 39: 341. 1984; R. Mathur in Hajra et al., Fl. India 13: 199.1995. *Senecio corymbosus* Wall. ex DC. in Wight, Contrib. 22. 1834; Hook. f., Fl. Brit. India 3: 351. 1881; Gamble, Fl. Pres. Madras 723(508). 1921; Fyson, Fl. South Indian Hill St. 1: 245. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 47.1987. **(PLATE 9: 76)**

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Climbing shrubs; stem covered with fulvous-woolly hairs. Leaves 6-8 x 6-8 cm, broadly ovate, apex acuminate, base cordate, 5-7 ribbed, glabrous above, distantly serrulate; petiole 3-4 cm long. Heads 9 x 6 mm, in woolly panicles, axillary or terminal; bracts 1-seriate, 6 x 1.5 mm, oblong, with thick midrib, glabrous. Corolla 7 mm long; lobes acute, yellow. Anthers tailed at base. Achenes oblong, glabrous, brown; pappus 7 mm long.

Flowering & Fruiting: March - November.

Notes: Climbing on shola trees ± 2200 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, b 8 (Cairn Hills).

CONYZA Less. *nom.cons.*

1. Panicles resumiform; plants hirsute, more than 1 m; pappus hairs yellow .... *C. bonariensis*
1. Panicles corymbiform; pappus hairs white or dirty white or yellow **2**

2. Heads pale rosy or purplish .... *C. japonica*
2. Heads bright yellowish .... *C. stricta*

80. Conyza bonariensis (L.) Cronq., Bull. Torrey Bot. Club 70. 632. 1943; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 36.1987; Hajra in Hajra et al., Fl. India 12: 104. 1995. *Erigeron bonariensis* L., Sp. Pl. 863. 1753. *Erigeron linifolius*

Willd., Sp. Pl. 3: 1955. 1803; Hook. f., Fl. Brit. India 3: 254. 1881; Fyson, Fl. South Indian Hill St. 3: t. 378. 1920. *Conyza ambigua* DC., Fl. Fr. 6: 468. 1815; Gamble, Fl. Pres. Madras 683(480). 1921. **(PLATE 9: 77)**

Distribution: Originally from America; now Pantropical. *Habitat*: Cultivated lands.

Erect herbs. stem ribbed, hispid. Leaves 8-20 x 1-3 cm, linear-elliptic to oblanceolate, apex acuminate, distantly serrate, hispid; petiole 1-2 cm long. Panicle 30-60 cm long, oblong, leafy. Heads 7 x 2 mm, oblong, cylindrical; bracts oblong, obtuse, 4 x 0.5 mm, glabrous; outer bracts smaller, hispid. Corolla of female flowers 3 mm long, slender. Bisexual flowers inner, few; corolla 4 mm long, widening upward. Achenes 1.5 mm long, biconvex, truncate, hairy, yellow; pappus 4 mm long, yellow.

Flowering & Fruiting: June - January.

Utility: Used in Folk medicine.

Notes: Weed of cultivation, roadside etc. ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 27.01.1991, a 71 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 20, 20.09.1995, 322 (TNFDH).

81. **Conyza japonica** (Thunb.) Less., Syn. Gen. Comp. 204. 1832; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683(480). 1921; Fyson, Fl. South Indian Hill St. 3: t. 381. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 36.1987; Hajra in Hajra et al., Fl. India 12: 105. 1995. *Erigeron japonica* Thunb., Fl. Jap. 312. 1784. *Conyza multicaulis* DC., Prodr. 5: 383. 1836.

Distribution: Indo-Malesia. *Habitat*: Shola border.

Herbs; stem solitary, 25-35 cm high, hispid. Leaves to 5 x 2.5 cm, obovate, obtuse, cuneate at base; petiole 1 cm long. Heads to 7 x 9 mm, globose, 5-8 together, in terminal clusters; bracts 3 mm long, lanceolate, glabrous; receptacle thinly hairy. Female corolla 1.5 mm long. Bisexual florets a few, at the centre; corolla 2.5 mm long, yellow; lobes acute. Achenes 1 mm long, compressed, oblong, thinly hairy; pappus 4 mm long, setaceous.

Flowering & Fruiting: April - July.

Notes: Found in slopes of shola forests ± 2100 m, common in Pykara.

82. **Conyza stricta** Willd., Sp. Pl. 3: 1922. 1803; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683(480). 1921; Fyson, Fl. South Indian Hill

St. 3: t. 380. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 36.1987; Hajra in Hajra et al., Fl. India 12: 109. 1995. **(PLATE 9: 78)**

Distribution: Indo-Malesia and Africa. *Habitat*: Cultivated lands.

Erect herbs. Stem terete or ridged, pubescent. Leaves to 2-5 x 1 cm, oblanceolate to spathulate, apex obtuse, entire or serrate, pubescent. Heads 3 x 3 mm, in dense corymbose panicle; bracts lanceolate, acute, pubescent outside. Corolla similar, 2.5 mm long, bright yellow. Achenes 1 mm long, ribbed, hairy; pappus 3 mm long, yellow.

Flowering & Fruiting: September - October.

Utility: Used in Folk medicine.

Notes: Found in open areas, cultivated lands etc. ± 2000 m, common in Finger post.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 63 (Cairn Hills); PSU & NKK, Kodanad, 31.08.1994, 243 (TNFDH); KNS, Glenmorghan, 11.05.1963, 543 (FRC).

COTULA L.

83. Cotula australis (Sieb. ex Spreng.) Hook. f., Bot. Antarch. Voy. 2: 128. 1852 & Handb. N. Zeal. Fl. 1: 128. 1853; Gamble, Fl. Pres. Madras 712(501). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 36.1987; B.D. Naithani in Hajra et al., Fl. India 12: 54. 1995. *Anacyclus australis* Sieb. ex Spreng., Syst. Veg 3: 497. 1826. **(PLATE 9: 79)**

Distribution: Pantropical. *Habitat*: Cultivated fields.

Prostrate herbs; branchlets ascending. Leaves alternate, pinnatifid, to 1.5 x 0.8 cm; segments linear. Capitulum solitary, terminal, heterogamous, disciform, 4 mm wide; peduncle to 5 cm. Involucre campanulate, 4 mm wide. Phyllaries 2-seriate, oblong, 2 mm. Ray florets 0. Outer florets pistillate, fertile, several-seriate, without corolla. Achenes obovate, 1.2 mm. Inner florets bisexual, tubular, 3 mm, 4-lobed. Pappus minute, auriculate. Stamens 4; anther-base obtuse. Achenes 8 mm, sessile.

Flowering & Fruiting: February - December.

Notes: Weed of cultivation, roadside etc. ± 2150 m, common in Pykara.

PSU & NKK, Kodanad, 25.11.1994, 242 (TNFDH).

CRASSOCEPHALUM Moench.

84. Crassocephalum crepidioides (Benth.) S. Moore, J. Bot. 1: 211. 1912; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 37.1987; R. Mathur in Hajra et al., Fl. India 13: 201. 1995. *Gynura crepidioides* Benth. in Hook., Niger Fl. 438. 1849. *Erechtites valerianaefolia* sensu C.E.C. Fisch. in Gamble, Fl. Pres. Madras 1882(1302).1936, non (Wolf.) DC. 1838. **(PLATE 9: 80)**

Common names: Red-flower ragleaf (E); Appuppanthadi (M).

Distribution: India, Sri Lanka, China, Africa and Madagascar. *Habitat*: Cultivated fields.

Tall herbs. Leaves 8-12 x 4-6 cm, lower ones lyrate pinnatifid, elliptic-oblanceolate, apex acute, dentate, sparsely pubescent; petiole to 3 cm. Racemes terminal; phyllaries 1-seriate, 8 mm, lanceolate. Calyculus free at base of the phyllaries, to 3 mm. Flowers yellow, 9-10 mm long. Ovary 2 mm, oblong; style 9 mm, bifid at apex. Achenes 4 mm, brown; pappus numerous, 8 mm long, white.

Flowering & Fruiting: August - December.

Utility: Used in Folk medicine.

Notes: Weed of cultivation, roadside etc. ± 2100 m, common in Mynala.

KNS, Barijam, 31.01.1967, 2711 (FRC).

DAHLIA Cav.

85. Dahlia imperialis Roezl ex Ortgies, Gartenflora 12: 243. 1863; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 37.1987. *Dahlia maximiliana* Hort. ex Hook.f., Bot. Mag. t. 7655. 1899. **(PLATE 9: 81)**

Common names: Tree Dahlia (E).

Distribution: Native of Central America. *Habitat*: Introduced as garden plant, now getting naturalised in the high ranges.

Perennial, branched, spreading, leafy shrubs; branchlets 4-angled, swollen at nodes. Leaves opposite, 2-3-pinnate; lower ones to 30 x 25 cm; leaflets ovate-lanceolate, to 13 x 8 cm, serrate, fine pubescent; petiole to 15 cm, canaliculate, base sheathing. Capitula numerous, 8, terminal, heterogamous, nodding; peduncles to 10 cm. Phyllaries in 2 whorles: outer 5, pandurate, to 1.5 x 0.5 cm, green, spreading; inner

oblong, to 2.2 x 0.8 cm, yellowish. Outer ray florets 8, neutral or female, rays ovate-laceolate, 8 x 3.5 cm, rose, pointed at apex. Inner disk floret female, yellow. Stamens 5, anther-base obtuse. Style 2-lobed; lobes linear. Achenes dorsally compressed.

Flowering & Fruiting: August - January.

Notes: An exotic species is commonly cultivated as an ornamental plant, now found as a runwild in the ecotone region of sholas ± 2100 m, common in Pykara.

DICHROCEPHALA DC.

1. Herbs, usually spreading; leaves up to 7.5 cm long .... *D. chrysanthemifolia*
1. Herbs, erect, rigid; leaves usually up to 5 cm long .... *D. integrifolia*

86. Dichrocephala chrysanthemifolia (Blume) DC. in Wight, Contrib. 11. 1834; Hook. f., Fl. Brit. India 3: 245. 1881; Gamble, Fl. Pres. Madras 679(477). 1921; Fyson, Fl. South Indian Hill St. 2: t. 156. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 37.1987; Hajra in Hajra et al., Fl. India 12: 114. 1995. *Cotula chrysanthemifolia* Blume, Bijdr. 918. 1826. **(PLATE 10: 82)**

Distribution: Paleotropics. *Habitat*: Shola border.

Erect herbs; branchlets radiating, hispid. Leaves alternate, lyrate-pinnatifid, chartaceous, 5 x 1.5 cm, margin deeply incised, base auricled and stem-clasping. Panicles terminal, sparingly or copiously branched, lax. Capitula globose, 5 mm wide, heterogamous, disciform, cream. Involucre broadly campanulate, 1-2-seriate. Phyllaries ca 10, lanceolate. Outer florets pistillate, sub-radiate; inner florets bisexual. Pappus 0 in pistillate, and of 2 or 3 slender hairs in bisexual ones. Corolla (outer) curved, 6 mm wide, subradiate; (inner) tubular, campanulate, 1 mm wide, 4-lobed. Stamens 5, included; anther base truncate. Ovary compressed; style 1 mm, minutely 2-fid. Achenes obovoid. Pappus 0 in pistillate, of 2 weak bristles in bisexual ones.

Flowering & Fruiting: July - December.

Utility: Used in Folk medicine.

Notes: Found in bare slopes, roadsides etc. ± 2200 m, common in Pykara.

PSU & NKK, Dodabetta, 11.02.1991, c 66 (Cairn Hills); PSU & NKK, Kodanad, 02.09.1994, 152 & 31.08.1994, 589 (TNFDH).

87. Dichrocephala integrifolia (L. f.) O. Ktze., Rev. Gen. Pl. 1: 333. 1891; Hajra in Hajra et al., Fl. India 12: 114. 1995. *Hippia integrifolia* L. f., Suppl. Pl. 389.

1781. *Dichrocephala latifolia* (Pers.) DC. in Wight, Contrib. 11. 1834; Hook. f., Fl. Brit. India 3: 245. 1881; Gamble, Fl. Pres. Madras 679(477). 1921; Fyson, Fl. South Indian Hill St. 2: t. 155. 1932. *Cotula latifolia* Pers., Syn. 2: 464. 1805; Hook. f., Fl. Brit. India 3: 245. 1881. *Dichrocephala bicolor* (Roth) Schltr., Linnaea 25: 209. 1952; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 37.1987. **(PLATE 10: 83)**

Distribution: Tropical and Subtropical Asia, Africa, Pacific Islands and Australia. *Habitat*: Shola border.

Diffuse herbs, hispid. Leaves alternate, 3-4 x 2-3 cm, ovate, apex obtuse, irregularly lobed. Heads 3-4 mm across, globose, in terminal panicles; bracts 1-seriate, lanceolate, acute, ciliate. Flowers two types. Female flowers in several outer rows; corolla tubular, 2-4-toothed at apex, glabrous. Bisexual flowers few, central; corolla 4-lobed at apex, white; anthers 4, connate, included. Achenes 1 mm long, obovate, compressed, 4-ribbed, glabrous; pappus 4 deciduous bristles.

Flowering & Fruiting: August - December.

Utility: Used in Folk medicine.

Notes: Found in moist places, marsh, shola floor, in fallow ground ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 28.01.1991, II a 67 (Cairn Hills); KNS, Bandy shola, 11.05.1963, 564 (FRC).

EMILIA Cass.

1.	Leaves only cauline	*E. ramulosa*
1.	Leaves cauline as well as radical	*E. sonchifolia*

88. Emilia ramulosa Gamble, Bull. Misc. Inform. Kew 1921: 120. 1921; Gamble, Fl. Pres. Madras 716(504). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2:38.1987; R. Mathur in Hajra et al., Fl. India 13: 211. 1995. **(PLATE 10: 84)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Herbs. Leaves all cauline, 3-5 x 0.6-1 cm, linear-oblong, auricled at base, glabrous above, white curled-hairy below, margins recurved. Heads solitary or 2-3, on long terminal peduncles of 10-25 cm high. Flowers homogamous. Involucre bracts uniseriate, 0.8-1 cm long, lanceolate, curled hairy without. Corolla purple; tube 0.8-1 cm long, widened at mouth, 5-lobed; lobes pubescent at tips. Stamens 5, linear,

obtuse at base. Style arms hairy at tips. Achenes 0.2-0.3 cm long, 5-ribbed, scabrid on ribs. Pappus of soft slender white hairs, 0.5-0.6 cm long.

Flowering & Fruiting: May - June.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Sispara.

89. **Emilia sonchifolia** (L.) DC. in Wight, Contrib. 24.1834; Hook. f., Fl. Brit. India 3: 336. 1881; Gamble, Fl. Pres. Madras 716(503). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 38.1987; R. Mathur in Hajra et al., Fl. India 13: 212. 1995. *Cacalia sonchifolia* L., Sp. Pl. 835. 1753. **(PLATE 10: 85)**

Common names: Ilikivigida, Kage porlu (K); Elichevianveru, Muyalchevian, Orichozhiyan (M).

Distribution: Tropical and Subtropical Africa and Asia. *Habitat*: Grasslands.

Erect or diffuse herbs. Leaves radical and cauline; radical leaves 4-10 x 1-3 cm, lyrate-pinnatifid with large terminal lobes, semi-orbicular; cauline leaves small, obovate to spathulate. Heads homogamous, not rayed, 1-3 on long slender peduncles. Involucral bracts cylindric, uniseriate, 6-8 mm long, oblong-lanceolate. Florets bisexual. Corolla pink, 3-3.5 mm long, wider to the mouth, lobes 5. Stamens 5; anthers 1-1.5 mm long. Ovary ca 1.5 mm long; style-arms acute. Achenes 1-2 mm long, 5-ribbed, hispid. Pappus white silky, 5-6 mm long.

Flowering & Fruiting: July - December.

Utility: Used in Ayurveda, Folk, Siddha and Unani. The plant is sudorific. Decoction of it is used as febrifuge in infantile tympanites and in bowel complaints. The root is used to treat diarrhoea. The juice of fresh leaves is used to treat sore ears, sore eyes and night-blindness. The plant is also used to treat cuts and wounds.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Pykara, 30.01.1991, L b 16 & Upper Bhavani, 17.02.1991, a 69 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1994, 161 & 31.08.1994, 241 (TNFDH); KNS, Kodanad, 07.05.1963, 432 (FRC).

ERIGERON L.

90. **Erigeron karvinskianus** DC., Prodr. 5: 285. 1836; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 39.1987; Hajra in Hajra et al., Fl. India 12: 122. 1995.

Erigeron mucronatus DC., Prodr. 5: 285. 1836; Gamble, Fl. Pres. Madras 682 (480). 1921; Fyson, Fl. South Indian Hill St. 3: t. 379. 1920. **(PLATE 10: 86)**

Common names: Pottu-poovu (M).

Distribution: Neotropics, Mexico to Venezuela, Chile and the Antilles. *Habitat*: Crevices of walls, wayside etc.

Sprawling perennial herbs, usually forming dense clumps; stems numerous, decumbent to weakly erect, slender, usually branched, glabrate to sparsely pubescent. Leaves 1-4 x 0.1-1 cm, linear to elliptic, entire to dentate or shallowly lobed, lower ones often oblanceolate and 3-lobed. Heads solitary, 1-1.5 cm in diameter; involucral bracts in 3 series, linear, 3-6 mm long; ray florets 75-100 or more per head, rays white, becoming pink with age, 9-10 mm long; disk florets numerous; corolla yellow. Achenes pale brown, ca. 1 mm long.

Flowering & Fruiting: Throughout the year.

Notes: Naturalised in Crevices of walls, wayside etc. ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 72 (Cairn Hills).

GALINSOGA Ruiz & Pavon.

91. Galinsoga parviflora Cav., Ic. 3: 41, t. 281. 1796; Hook. f., Fl. Brit. India 3: 311. 1881; Gamble, Fl. Pres. Madras 711(500). 1921; Fyson, Fl. South Indian Hill St. 3: t. 391. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 40.1987; H.J. Chowdhery in Hajra et al., Fl. India 12: 388. 1995. **(PLATE 10: 87)**

Common names: Gallant soldier, Quick Weed (E); Mukuthipoovu (M).

Distribution: Native of Tropical America. *Habitat*: Cultivated fields.

Erect branched herbs, 30-40 cm high; stem smooth. Leaves opposite, 3-5 x 2-3 cm, ovate, acute, glabrous, serrate, 3-ribbed from base. Heads 4 x 3 mm, many, in axillary or terminal peduncled cymes; peduncles dichotomous, slender; bracts biseriate, 3 x 2 mm, ovate, acute, glabrous; receptacle paleate. Outer row of flowers ligulate, limb deeply 3-lobed, white. Inner flowers tubular, bisexual; corolla 1.5 mm long, 5-toothed; anthers obtuse at base. Achenes 2 mm long, obovoid, truncate, black, 3-4-angled, scabrid; pappus of 3-4 fimbriate hyaline scales.

Flowering & Fruiting: December - April.

Utility: Used in Folk medicine.

Notes: Weed of cultivation, roadside etc. ± 2150 m, common in Pykara.

PSU & NKK, Wenlockdowns, 10.02.1991, II a 74 (Cairn Hills); PSU & NKK, Kodanad, 06.06.1994, 54 & 11.03.1994, 330 (TNFDH).

GAMOCHAETA Wedd.

92. Gamochaeta pensylvanica (Willd.) Cabrera, Bol. Soc. Argent. Bot. 9: 375. 1961. *Gnaphalium pensylvanicum* Willd., Enum. Pl. 2: 867. 1809; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 40.1987. *Gnaphalium peregrinum* Fernals, Rhodora 45: 479, t. 795. 1943. *Gnaphalium purpureum* sensu Hook. f., Fl. Brit. India 3: 289. 1881, non L. 1753; P.C. Pant in Hajra et al., Fl. India 13: 92. 1995. **(PLATE 10: 88)**

Common names: Spoonleaf purple everlasting (E).

Distribution: North and South America, Europe; adventive in New Zealand, India & Pakistan. *Habitat*: Cultivated lands.

Herbs, erect, upto 50 cm high; stem, with thin, white cottony tomentum. Leaves spathulate, narrowed at base, broadly rounded and shortly mucronate at apex, entire, 1-7 x 0.1-1 cm, puberulous on upper surface, white pannose on lower surface. Heads in short spicate clusters, ca 2 mm across; peduncle ca 1 mm long. Involucral bracts 3-4-seriate; outermost brown, occasionally pink at apex, oblong-spathulate, obtuse-acute, with white woolly tomentum at base. Ray florets female, with filiform corolla, ca 1 mm long, pink at mouth. Disc florets bisexual, ca 2 mm long, 5-toothed. Achenes oblong, ca 0.5 mm. Pappus hairs white, united at base.

Flowering & Fruiting: Throughout the year.

Notes: Weed of cultivation, roadside etc. ± 2320 m, common in Mukurthi.

GYNURA Cass.

1. Glabrous herbs; leaves oblanceolate, base attenuate, apex acute; heads yellow .... ***G. nitida***
1. Hispid herbs; leaves obovate, base amplexicaul, apex obtuse; heads orange ...... ***G. travancorica***

93. Gynura nitida DC. in Wight, Contrib. 24. 1834; Hook. f., Fl. Brit. India 3: 333. 1881; Gamble, Fl. Pres. Madras 714(502). 1921; Fyson, Fl. South Indian Hill St. 3: t. 393. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 41. 1987; R. Mathur in Hajra et al., Fl. India 13: 221. 1995. **(PLATE 10: 89)**

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Stout herbs, stem furrowed, glabrous. Leaves basal and cauline, similar, 10-15 x 3-4 cm, oblanceolate, entire, apex obtusely acute, narrowed and amplexicaule at base. Heads 16 x 12 mm, cylindrical, 10-20 together, in panicled cymes; bracts 10 x 2 mm, lanceolate, acute; receptacle rugose. Flowers not all fertile; corolla 10 mm long, lobes obtuse, glandular. Achenes 3.5 x 1 mm, ellipsoid, 11-ribbed, truncate, black; pappus 14 mm long, white.

Flowering & Fruiting: January - December.

Notes: Found wayside, in thin layer of soil by rocks etc. ± 2100 m, common in Pykara.

PSU & NKK, Kodanad, 30.11.1994, 376 (TNFDH).

94. Gynura travancorica W. W. Smith, Rec. Bot. Surv. Ind. 6: 29. 1914; Gamble, Fl. Pres. Madras 714(502). 1921; Davies, Kew Bull. 35: 364. 1981; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 42.1987; R. Mathur in Hajra et al., Fl. India 13: 224. 1995. **(PLATE 10: 90)**

Common names: Moyalu-kola, Koppuchedi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests and Grasslands.

Erect herbs, 60-100 cm high, whole plant hispid tomentose. Leaves 10-13 x 3.5 cm, elliptic, acute at either ends, sharply and distantly serrate; upper ones amplexicaule. Heads 16-18 x 7 mm, 15-20, in terminal panicled cymes; bracts 11 x 2 mm, oblong, acute, glabrous. Flowers many; corolla yellow, 13 mm long, lobes acute, glandular; anthers 2 mm long, obtuse at base. Achenes ribbed, pubescent, black; pappus 12 mm long, white.

Flowering & Fruiting: February - May.

Notes: Found in sides by rock edges ± 2200 m, common in Ankinda.

HELICHRYSUM Miller

1. Erect herbs; branchlets scabrous; capitula more than 3 cm, white or yellow ....***H. bracteatum***
1. Subscandent; branchlets cottony; capitula less than 0.5 cm wide, yellow ....***H. buddleioides***

95. Helichrysum bracteatum (Vent.) T. Anders., Bot. Repos. 6: t. 365 & sub. t. 428. 1805; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 42.1987. *Xerantherum bracteatum* Vent., Jard. Mal. 1: t. 2. 1803. **(PLATE 11: 91)**

Common names: Everlasting flower (E).

Distribution: Native of Australia. *Habitat*: Run wild along roadsides.

Stout, erect herbs; branchlets scabrous, brownish. Leaves oblong-acute, to 9 x 1 cm, sessile, decurrent. Capitulum solitary, terminal, 4 cm wide, heterogamous, disciform, yellow(white). Phyllaries 5-7-seriate, scarious, imbricate; outer ones obtuse, to 12 x 10 mm, inner ones elongate, to 16 x 8 mm, bright yellow, base greenish. Receptacle flat, 1.5 cm wide. Pistillate florets peripheral, 1 or 2 whorls. Inner ones bisexual, numerous, 1.2 cm long, yellow. Pappus plumose, yellowish, 1 cm, as long as corolla. Corolla-tube 1 cm, basal half yellow, upper half lighter. Stamens 5. Ovary 2 mm; style 8 mm; stigma 2-lobed, reflexed, exserted. Achenes terete, 2 mm. Pappus bristles plumose only at apex.

Flowering & Fruiting: May - December.

Notes: Found in degraded fallow ground ± 2150 m, common in Dodabetta.

PSU & NKK, Kodanad, 02.09.1994, 153 & 20.09.1994, 180 (TNFDH); KNS, Naduvattam, 13.05.1963, 272 (FRC).

96. Helichrysum buddleioides DC. in Wight, Contrib. 20. 1834; Hook. f., Fl. Brit. India 3: 290. 1881; Gamble, Fl. Pres. Madras 699(491). 1921; Fyson, Fl. South Indian Hill St. 2: t. 157. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 42.1987; P.C. Pant in Hajra et al., Fl. India 13: 99.1995. *Hedysarum hookerianum* Wight & Arn. in DC., Prodr. 6: 201. 1838. *Helichrysum buddleioides* var. *hookerianum* (Wight & Arn.) Hook. f., Fl. Brit. India 3: 291. 1881. **(PLATE 11: 92)**

Common names: Panjipoovu (M).

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Subshrubs, 50-70 cm high, densely cottony woolly. Leaves 5-10 x 1.5-2 cm, elliptic-oblong, acute at apex, narrowed and amplexicaule at base, sparsely cottony above, 5-7-ribbed. Heads 4 x 4 mm, globose, densely packed; bracts 3-4-seriate, 3.5 x 1 mm, oblanceolate, obtuse, yellow or hyaline, glabrous. Bisexual flowers 10-15; corolla 2 mm long, glabrous, yellow. Female flowers many; corolla 3 mm long. Achenes 3-angled, scabrid.

Flowering & Fruiting: November - March.

Notes: Found in roadside, mud walls in shade ± 2000 m, common in Parsons valley.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 77 (Cairn Hills); PSU & NKK, Kodanad, 02.09.1994, 153 (TNFDH); PFF, Ootacamund, 00.01.1909, 1826 (FRC).

HYPOCHOERIS L.

97. Hypochoeris glabra L., Sp. Pl. 1141. 1753; Hook. f., Fl. Brit. India 3: 401. 1881; Gamble, Fl. Pres. Madras 729(512). 1921; Fyson, Fl. South Indian Hill St. 3: t. 402. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 42.1987; Mamgain & R.R. Rao in Hajra et al., Fl. India 12: 250. 1995. **(PLATE 11: 93)**

Distribution: Introduced from Europe; now naturalised in Nilgiri hills and adjoining areas. *Habitat*: Grasslands.

Perennial, scapigerous herbs. Stems unbranched, to 25 cm. Leaves radical, rosulate, runcinate-pinnatifid, to 12 x 2 cm, chartaceous, subsessile. Capitulum solitary, homogamous, yellow, to 16 x 6 mm. Involucre 2-3-seriate. Phyllaries lanceolate, outer ones 3 mm, inner ones to 16 mm. Receptacle flat, 3 mm wide; paleae narrow, hyaline. Florets all ligulate, yellow. Pappus in 1 series. Corolla 5-toothed, to 8 mm long. Stamens 5; anther-base sagittate, acuminate. Style arms obtuse. Achenes oblong-linear, 10-ribbed, 4 mm, of 2 kinds; Outer truncate, not beaked; inner fusiform, long-beaked.

Flowering & Fruiting: April - December.

Notes: Weed of roadside drainages and plantations ± 2200 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, b 17 (Cairn Hills); KNS, Kokuthurai, 12.05.1963, 583 (FRC).

KLEINIA Miller

98. Kleinia walkeri (Wight) Uniyal in Rao et al., Fl. Ind. Enum. Aster. 49. 1988; R. Mathur in Hajra et al., Fl. India 13: 227.1995. *Gynura walkeri* Wight, Ic. t. 122. 1846. *Notonia walkeri* (Wight) Clarke, Comp. Ind. 170. 1876; Hook. f., Fl. Brit. India 3: 337. 1881; Gamble, Fl. Pres. Madras 717(504). 1921; Fyson, Fl. South Indian Hill St. 3: t. 396. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 44.1987. *Senecio stylosus* Balakr., Journ. Bombay Nat. Hist. Soc. 67: 62. 1970. **(PLATE 11: 94)**

Distribution: India, Sri Lanka and Indonesia. *Habitat*: Shola border.

Fleshy subshrubs, to 1.5 m high; stem glabrous. Leaves to 13 x 4 cm, alternate, elliptic, acuminate at either ends, crenate-serrate, glabrous; petiole 4 cm long. Heads 14 x 8 mm in terminal corymbose panicle; bracteolate; involucral bracts 10 mm long, uniseriate, oblong, glabrous; receptacle paleate. Flowers all bisexual, tubular; corolla 8 mm long, 5-lobed, white or pale yellow; anthers entire at base. Achenes 5 mm long, oblong, 10-ribbed; hairy between ribs; pappus many, cottony, white, setaceous.

Flowering & Fruiting: September - April.

Notes: Found in the ecotone region of sholas ± 2150 m, common in Sispara.

LAUNAEA Cass.

99. **Launaea acaulis** (Roxb.) Babc. ex Kerr. in Craib, Fl. Siam. 2: 299. 1936; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 43. 1987; Hajra in Hajra et al., Fl. India 12: 304. 1995. *Prenanthes acaulis* Roxb., Fl. Ind. 3: 403. 1832. *Microrhynchus glabra* (DC.) Wight, Ic. t. 1145. 1846. *Lactuca glabra* (DC.) Wight, Contrib. 26. 1834. *Crepis acaulis* (Roxb.) Hook. f., Fl. Brit. India 3: 396. 1881; Gamble, Fl. Pres. Madras 730(513). 1921; Fyson, Fl. South Indian Hill St. 2: t. 174. 1932. **(PLATE 11: 95)**

Distribution: India, Afghanistan, Nepal, Pakistan and Iran. *Habitat*: Grasslands.

Scapigerous perennial herbs with thick rootstock; juice milky. Leaves all basal, 8-15 x 1-3 cm, oblong, acute or obtuse, entire or finely toothed, glabrous. Heads 15 x 8 mm, cylindrical, 10-15 together, cymose, on elongated scapes. Scapes 3-5, 15-20 cm high, branched, glabrous. Bracts uniseriate, 10 x 2.5 mm, acute, oblong, margins white. Flowers all ligulate; corolla bright yellow, 18 mm long, glabrous, limb oblong; anthers sagittate at base. Achenes 5 x 1 mm, compressed, yellowish brown.

Flowering & Fruiting: March - December.

Utility: Used in Ayurveda and Siddha medicine.

Notes: Found in the ecotone region of grasslands ± 2000 m, common in Western Catchment.

MOONIA Arn.

100. **Moonia heterophylla** Arn., Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 349. 1836; Gamble, Fl. Pres. Madras 704(495). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 44.1987; H.J. Chowdhery in Hajra et al., Fl.

India 12: 401. 1995. *Chrysogonum heterophyllum* (Arn.) Benth. ex Clarke, Comp. Ind. 182. 1876; Hook. f., Fl. Brit. India 3: 303. 1881; Fyson, Fl. South Indian Hill St. 3: t. 388. 1920. *Moonia arnottiana* Wight, Ic. t. 1105. 1846; Gamble, Fl. Pres. Madras 704(495). 1921; Manilal, Fl. Silent Valley 155. 1988. *Chrysogonum arnottianum* (Wight) Benth. ex Clarke, Comp. Ind. 132. 1876; Hook. f., Fl. Brit. India 3: 303. 1881. **(PLATE 11: 96)**

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Erect subshrubs, to 70 cm high. Leaves opposite, to 8 x 8 cm; lowers 1-pinnately compound or divided; lobes elliptic, acuminate, serrate; hirtus below; petiole sheathing at base. Heads 10 x 8 mm, solitary, pedunculate, upper axillary; bracts 6 x 2 mm, obovate, acute, ciliate. Outer flowers female, ligulate; limb deeply divided into 3 lobes, yellow. Bisexual flowers central; corolla tubular; anthers entire at base, black. Achenes 3.5 x 2 mm, biconvex, puberulus, black; pappus absent.

Flowering & Fruiting: February - September.

Notes: Found in shola floor and border, way side ditches, stream banks etc. ± 2200 m, common in Ankinda.

MYRIACTIS Less.

101. Myriactis wightii DC. in Wight, Contrib. 10. 1834, var. **wightii**; Hook. f., Fl. Brit. India 3: 247. 1881; Gamble, Fl. Pres. Madras 680(478). 1921; Fyson, Fl. South Indian Hill St. 2: t. 158. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 44.1987; Hajra in Hajra et al., Fl. India 12: 135. 1995. **(PLATE 11: 97)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Erect annual herbs; branchlets villous. Leaves alternate, to 3-4 x 1-2 cm, lanceolate or ovate, subauriculate, cuneate-attenuate at base, acute at apex, apiculate, margins irregularly serrate, villous; petiole long, winged. Heads heterogamous, solitary, radiate. Involucre hemispheric, bracts few seriate, narrow, margins scarious. Ray florets white turning purplish, disc yellow. Anthers obtuse at base. Achenes oblanceolate, glabrous, 2-ribbed.

Flowering & Fruiting: April - August.

Notes: Found in the shola floor, stream bank etc. ± 2200 m, common in Pykara.

KNS, Longwood, 20.04.1964, 1214 (FRC).

PICRIS L.

102. Picris hieracioides L., Sp. Pl. 792. 1753; Hook. f., Fl. Brit. India 3: 393. 1881; Gamble, Fl. Pres. Madras 728 (512). 1921; Fyson, Fl. South Indian Hill St. 2: t. 173. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 45.1987. **(PLATE 11: 98)**

Distribution: India, North West Asia and North Africa. *Habitat*: Shola border.

A branched, erect, coarse herbs; branchlets hispid. Leaves basal, also cauline, alternate, oblong to oblanceolate, to 20 x 2.5 cm, chartaceous, base clasping, margin sinuate-dentate, very scabrid on margins and nerves below. Corymbs terminal or in upper axils, lax, to 20 cm wide; peduncles to 9 cm. Capitula homogamous, 2 cm wide. Receptacle flat, 4 mm wide. Involucre campanulate. Phyllaries several-seriate; outer ones foliaceous, inner ones herbaceous. Florets 1.3 cm; ligules truncate, 5-toothed. Stamens 5; anther-bases sagittate. Style arms slender. Achenes ellipsoid, 4.5 mm, ribbed, transversely barred between ribs. Pappus hairs feathery, copious.

Flowering & Fruiting: August - January.

Utility: Used in Folk medicine.

Notes: Found in bare slopes of sholas ± 2150 m, common in Sispara.

PSU & NKK, Kodanad, 20.10.1994, 416 (TNFDH); KNS, Kokuthurai, 12.05.1963, 574 (FRC).

SENECIO L.

1. Erect herbs; capitula yellow 2
1. Subscandent shrubs; achenes with pappus .... ***S. scandens***

2. Unbranched; leaves at an acute angle to stem, overlapping, more than 3 cm long, margin reflexed; corymbs compact .... ***S. lavandulaefolius***
2. Branched; leaves otherwise, more than 4 cm long, margin not reflexed; corymbs lax 3

3. Ligules present and usually conspicuous, yellow .... ***S. zeylanicus***
3. Ray flowers female without pappus to the achenes, usually sterile; disc flowers bisexual with pappus, fertile; heads with bracteoles below the involucre and on the pedicels 4

4. Capitula large, broadly campanulate, on short, stout peduncle; pappus red 5
4. Capitula small, narrowly campanulate, on long, slender peduncle; pappus stramineous .... ***S. wightii***

5. Leaves obovate, serrate, upper cauline leaves with dialated, auricled base .... ***S. multiceps***
5. Leaves linear-oblong, deeply toothed, without dialated, auricled base .... ***S. lessingianus***

103. Senecio lavandulaefolius DC. in Wight, Contrib. 23. 1834 & Prodr. 6: 368. 1838; Hook. f., Fl. Brit. India 3: 343. 1881; Fyson, Fl. South Indian Hill St. 2:t. 171. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 47. 1987; Gamble, Fl. Pres. Madras 721(507). 1921. *Pseudojacoboea lavandulaefolius* (DC.) R. Mathur in R.R. Rao et al., Fl. Ind. Enum. Aster. 59. 1988; R. Mathur in Hajra et al., Fl. India 13: 304. 1995. **(PLATE 11: 99)**

Distribution: India. *Habitat*: Grasslands.

Erect, hispid, unbranched herbs. Leaves alternate, oblong to broad-lanceolate, to 3 x 1 cm, base cuneate, margin strongly reflexed, apex acute, hispid-villous, closely imbricate, at an acute angle to the stem, fluffy below. Corymbs terminal, compact, 5 cm wide. Capitula heterogamous, radiate, 2.5 cm wide, ca 10 to the corymb; peduncle to 4 cm. Involucre campanulate, calyculate; receptacle flat, 4 mm wide. Phyllaries linear-oblong, 6.5 mm. Outer(ray) florets 1.2 cm; ligule 4-nerved, 3-fid. Achene 2 mm. Inner(disk) florets 7 mm. Corolla 1 mm wide, tube 4.5 mm; lobes 5. Stamens 5. Achene linear, 1.5 mm.

Flowering & Fruiting: February - June.

Notes: Found on the slopes of sholas ± 2100 m, common in Bangitapal.

PSU & NKK, Mukurthi, 13.02.1991, b 7 (Cairn Hills).

104. Senecio lessingianus (Wight & Arn.) Clarke, Comp. Ind. 198. 1876; Hook. f., Fl. Brit. India 3: 344. 1881; Gamble, Fl. Pres. Madras 722(508). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 47.1987. *Doronicum lessingianum* Wight & Arn., Arn. Pugill. Pl. Ind. Or. 106. 1836. **(PLATE 12: 100)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Perennial herbs; stems ascending, villously hispid, brownish on drying. Leaves elliptic-oblong, deeply and coarsely toothed, 2.5-5 x 1.5-1.9 cm, reddish brown on drying, hairy on both the surfaces, sessile, closely set on the stems. Capitula radiate, 1.5-2.5 cm in diam., bracteolate. Involucre broadly campanulate, 5-6 mm long, hispid; bracts 10-15, oblong-lanceolate, 5-6 x 2-2.2 mm, obtuse, herbaceous with broad, scarious margins, with purplish tip. Ray florets 8-10, 11-11.5 mm long; ray broadly oblong, ca 9 mm long, 9-12 veined; tube ca 2.5 mm long. Disc florets ca 4.2 mm long; limb 5-lobed; lobes slightly apiculate; tube ca 2 mm long. Achenes cylindrical, ca 5 mm long, ribbed, pubescent on ribs. Pappus hairs red, scabrid, ca 5 mm long.

Flowering & Fruiting: February - May.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Ankinda.

105. Senecio multiceps Balakr., Journ. Bombay Nat. Hist. Soc. 67: 57. 1970; R. Mathur in Hajra et al., Fl. India 13: 272. 1995. *Madaractis polycephala* DC., Prodr. 6: 440. 1838. *Senecio polycephalus* (DC.) Clarke, Comp. Ind. 197. 1876; Hook. f., Fl. Brit. India 3: 344. 1881; Fyson, Fl. South Indian Hill St. 3: t. 399. 1920; Gamble, Fl. Pres. Madras 722(507). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 48.1987, non Ledeb.1830.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Perennial, rhizomatous, glandular hispid herbs; stems creeping, 25-45 cm high, corymbosely branched from the base or below the inflorescence. Leaves obovate-oblong to linear-lanceolate, margins thick, crenate, 1.5-8.5 x 0.2-4 cm, dark brown on drying, prominent veined on the lower surface, sessile, with dilated auricled base. Capitula radiate, few, in terminal corymb, 1.5 cm in diam., 4-5 bracteolate; bracteoles linear-lanceolate; peduncle 1-5.5 mm long. Involucre broadly campanulate, ca 10.5 mm long; bracts 10-15, linear-oblong, 5.5 mm long, acuminate, herbaceous with narrow scarious margins. Ray florets broadly oblong; tube 3.5 mm long. Disc florets ca 5 mm long; limb 3 mm long; tube 2 mm long. Achenes golden yellow, slender, ca 4 mm long. Pappus stramineous, of unequal, scabrid hairs, ca 4.5 mm long.

Flowering & Fruiting: August - October.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Western Catchment.

106. Senecio scandens Hook. f., Fl. Brit. India 3: 352. 1881, p. p., non Buch.-Ham. ex D. Don 1825; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 48.1987. *Senecio wightianus* DC. in Wight, Contrib. 22. 1834; Gamble, Fl. Pres. Madras 723(509). 1921; Fyson, Fl. South Indian Hill St. 2: t. 172. 1932. *Senecio intermedius* Wight,Ic. t. 1135. 1846; Gamble, Fl. Pres. Madras 723(509). 1921; R. Mathur in Hajra et al., Fl. India 13: 259. 1995. **(PLATE 12: 101)**

Distribution: Indian subcontinent, South China, Philippines and Japan. *Habitat*: Shola border.

Climbing shrubs; stems ridged, zig-zag, glabrous. Leaves 5-10 x 2-4 cm, ovate, hastate at base, acute at apex, serrate, decurrent and auricled at the base of the petiole. Heads

7 x 5 mm, many, in axillary panicle with zig-zag branches; bracts 5 x 1.5 mm, oblong, similar. Female flowers peripheral; corolla 7 mm long, limb 3-lobed, yellow. Bisexual flowers central; corolla 4 mm long, tubular. Achenes ribbed, hairy between the ribs; pappus white, 3-4 mm long.

Flowering & Fruiting: December - April.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Pykara.

107. Senecio wightii (DC.) Benth ex Clarke, Comp. Ind. 197. 1876; Gamble, Fl. Pres. Madras 722(507). 1921; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 48.1987; R. Mathur in Hajra et al., Fl. India 13: 283.1995. *Doronicum wightii* DC. in Wight, Contrib. 23. 1834; Wight, Ic.t. 1124.1846. *Senecio saxatilis* Wall. ex DC. Prodr. 6 : 367. 1838; Hook.f., Fl. Brit. India 3: 344. 1881; Fyson, Fl. South Indian Hill St. 3: t. 398. 1920.

Distribution: India, Myanmar and China. *Habitat*: Shola border.

Perennial herbs, to 1 m tall with creeping rootstock; stem solitary, ascending, slender, simple or branched. Glaberous. Leaves linear- oblong or oblong- lanceolate, acute, serrate, 5-10 x 0.5-1.5 cm, sparsely adpressed pilose and pubescent on the veins on the lower surface, pinnatly veined; petiole of lower leaves very short; upper leaves sessile with broad auricled base; auricles amplexicaul. Capitula radiate, bracteolate; bracteoles 2-3, linear, acute. Involucres campanulate, 3-4 x 3.5-4 mm; bracts oblong-lanceolate, 3-4 mmm long acuminate, distinctly 3-veined, sparsely pubescent. Ray florets 7-8 mm long; ray oblong, 4-veined. Disc florets 3.5 mm long. Achenes cylindrical, ca 3 mm long, glabrous. Pappus stramineous or brownish red, ca 3 mm long, absent in ray florets.

Flowering & Fruiting: July - November.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Ankinda.

PSU & NKK, Porthimund, 13.02.1991, II b 9 (Cairn Hills).

108. Senecio zeylanicus DC., Prodr. 6: 365. 1824; Hook. f., Fl. Brit. India 3: 340. 1881; Gamble, Fl. Pres. Madras 721(507).1921; Fyson, Fl. South Indian Hill St. 3: t. 397. 1920; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 49.1987; R. Mathur in Hajra et al., Fl. India 13: 284.1995. *Senecio gracilis* Arn., Nov. Acta

Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 249. 1836. **(PLATE 12: 102)**

Distribution: Indo-Malesia. *Habitat*: Grasslands.

Erect, glabrous, branched herbs. Leaves alternate, linear-oblong to spathulate, to 10(20) x 0.8 cm, glabrous, base decurrent, margin obscurely toothed, apex acute, spreading. Corymbs terminal or in upper axils, notably diffuse, to 25 cm wide; peduncle to 7.5 cm. Capitula heterogamous, radiate, 1.5 cm wide; receptacle 2 mm wide. Phyllaries lanceolate, to 5.5 mm. Outer(ray) florets 1-seriate, to 7.5 mm. Ligule 3-lobed; tube 6 mm. Achene linear. Inner(disk) florets 5.5 mm. Corolla tube 4.5 mm; lobes 5. Stamens 5. Achene 1.5 mm. Pappus 5.5 mm.

Flowering & Fruiting: October - January.

Notes: Found on high grassy hill slopes ± 1800 m, common in Kinnakorai.

SIGESBECKIA L.

109. Sigesbeckia orientalis L., Sp. Pl. 900. 1753; Hook. f., Fl. Brit. India 3: 304. 1881; Gamble, Fl. Pres. Madras 704(495). 1921; Fyson, Fl. South Indian Hill St. 2: t. 168. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 49.1987; H.J. Chowdhery in Hajra et al., Fl. India 12: 407. 1995. **(PLATE 12: 103)**

Common names: Sigesbeckia (E); Ottadai (T).

Distribution: Throughout tropics. *Habitat*: Cultivated fields.

Erect herbs; stem scabrous and viscid. Leaves 7-15 x 3-10 cm, ovate, acute at apex, cuneate and decurrent at base, pubescent, dentate along the margins; petiole 1-5 cm long. Heads 8 x 4 mm, solitary, terminal, on slender, densely hairy peduncles; bracts biseriate, outer bracts spathulate, 8 mm long, viscid hairy; inner ovate, short. Flowers: outer row ligulate, female, inner bracts rows bisexual, tubular; limb of ligulate corolla 2 mm long, 3-lobed, yellow. Disc florets 2 mm long; anthers bases obtuse. Achenes 4 mm long, curved, truncate at apex, 4-angled; black; pappus absent.

Flowering & Fruiting: April - December.

Utility: Used in Folk and Siddha medicine. Whole plant is claimed to have healing properties in gangrenous ulcers and sores. Tincture of plant used externally with glycerine to cure ringworm and other parasitic affections. It is also used in rheumatism and renal colic.

Notes: Found in way side thicklets, fallow ground ± 2200 m, common in Sispara.

PSU & NKK, Wenlockdowns, 26.01.1991, b 10 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1994, 163 & 20.10.1994, 179 (TNFDH).

TARAXACUM Weber ex Wigg.

110. Taraxacum javanicum Soest, Wentia 10: 56, f. 27. 1963; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 50.1987. Hajra in Hajra et al., Fl. India 12: 258. 1995. *Taraxacum officinale* Hook. f., Fl. Brit. India 3: 401.1881,non Weber 1780; Gamble, Fl. Pres. Madras 731(514). 1921. **(PLATE 12: 104)**

Distribution: India, Sri Lanka and Indonesia. *Habitat*: Grasslands.

Prostrate herbs. Leaves oblanceolate, 5-15 cm long, tapering at the base into a petiole about a third as long, simple with irregularly dentate margins or runcinate-pinnatifid with 3-4 pairs of lateral lobes upto 3 cm long, terminal lobe hastate or deltoid, obtuse or subacute, sparsely araneose on both surfaces. Scapes 10-15 (-25) cm tall, araneose below the capitulum at first, glabrescent, involucre c. 6 mm diam., outer phyllaries reflexed spreading, inner ones erect, lanceolate, 10-12 mm long, shortly horned near the apex on the outer surface, margins scarious. Corollas yellow, ligules 10-12 mm long, greyish violet beneath. Anthers and styles yellow. Achenes 3.5-4 mm long (including cusp), yellowish brown, spinulose at the apex, cusp conical, 0.75-1 mm long. Rostrum 6-7 mm long; pappus white, 5 mm long.

Flowering & Fruiting: April - December.

Notes: Found in courtyards, wayside ± 2100 m, common in Pykara.

PSU & NKK, Kodanad, 02.09.1994, 155 (TNFDH); KNS, Glenmorghan, 11.05.1963, 539 (FRC).

VERNONIA Scherb.

1. Plants trees; heads 1-flowered .... *V. arborea*
1. Plants herbs or shrubs **2**

2. Plants shrubs; achenes silky pubescent or puberulous .... *V. pectiniformis*
2. Plants herbs; achenes glabrous .... *V. conyzoides*

111. Vernonia arborea Buch.-Ham., Trans. Linn. Soc. London 14: 218. 1824; Hook. f., Fl. Brit. India 3: 239. 1881; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 51.1987; Uniyal in Hajra et al., Fl. India 13: 359. 1995. *Monosis wightiana* DC. in Wight, Contrib. 1. 1834 & Ic. t. 1085. 1846. *Vernonia monosis* Benth. ex

Clarke, Comp. Ind. 24. 1876p.p., non Sch.-Bip. 1847; Gamble, Fl. Pres. Madras 672(473). 1921; Fyson, Fl. South Indian Hill St. 2: t. 152. 1932. *Vernonia arborea* Buch.-Ham. var. *wightiana* (DC.) Hook. f., Fl. Brit. India 3: 239. 1881. **(PLATE 12: 105)**

Common names: Eerakatthira, Karana, Kadavari, Malanperuva (M); Shutthi, Shelthi (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Medium sized trees; branchlets densely tomentose. Leaves obovate, 15 x 6 cm, coriaceous, glabrous above, tomentose below, acute-acuminate at apex, margin entire, obtuse or truncate at base; lateral nerves ca 10 pairs; petioles about 1.5 cm long. Heads homogamous, in large terminal tomentose corymbose panicles; florets tubular, bisexual, white. Achenes glabrous, 10-ribbed.

Flowering & Fruiting: September - March.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2150 m, common in Sispara.

112. Vernonia conyzoides DC. in Wight, Contrib. 6. 1834; Gamble, Fl. Pres. Madras 676(475). 1921; Fyson, Fl. South Indian Hill St. 2: t. 149. 1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 52. 1987; Uniyal in Hajra et al., Fl. India 13: 369. 1995. *Vernonia cinerea* sensu Hook. f., Fl. Brit. India 3: 233. 1881,p.p., non (L.) Less. 1829. **(PLATE 12: 106)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Tall herbs; branchlets pubescent. Leaves 9 x 4 cm, chartaceous, ovate, apex acuminate, dentate, puberulus above and white tomentose beneath; petiole 2 cm. Panicles axillary and terminal; phyllaries 2-4 seriate, pubescent, lanceolate, sharply acuminate, inner longer, 6 x 1 mm; florets 4 mm, blue; anthers cleft at base, apiculate; ovary 2 mm, pubescent; pappus 2-seriate, outer small, 2.5 mm, inner 5 mm, ca 20, feathery.

Flowering & Fruiting: September - March.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Parsons valley.

113. Vernonia pectiniformis DC. in Wight, Contrib. 2. 1834, var. **pectiniformis**; Hook. f., Fl. Brit. India 3: 239. 1881; Gamble, Fl. Pres. Madras 673(473).

1921; Fyson, Fl. South Indian Hill St. 2: t. 151.1932; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 53. 1987; Uniyal in Hajra et al., Fl. India 13: 377. 1995. **(PLATE 12: 107)**

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Undershrubs; branches terete, striate, glabrous or pubescent. Leaves elliptic-lanceolate, or ovate-lanceolate, acuminate, sharply serrate, upto 9 x 1.5 cm, narrowed towards base, glabrous above, pilose hairy beneath. Heads in terminal corymbs, 10-25-flowered. Involucral bracts dark tipped, obtuse, mucronate; outer ca 0.75 mm long; intermediate elliptic-oblong, ca 4 mm long; inner ca 5.5 mm long. Achenes ca 2 mm long, glandular, 10-ribbed. Pappus hairs reddish or dirty white; outer hairs short.

Flowering & Fruiting: April - December.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Western Catchment.

YOUNGIA Cass.

114. Youngia japonica (L.) DC., Prodr. 7:194.1838; V.Chandras. in Henry et al., Fl. Tamil Nadu 2: 55.1987; Hajra in Hajra et al., Fl. India 12: 329. 1995. *Prenanthes japonica* L., Mant. Pl. 1: 107. 1767. *Youngia japonica* ssp. *genuina* (Hochr.) Babc. & Stebbins, Carn. Inst. Wash. Publ. 484: 95. 1937. *Youngia napifolia* DC., Prodr. 7: 193. 1838. *Lactuca napifolia* DC. in Wight, Contrib. 27. 1834. *Crepis japonica* (L.) Benth., Fl. Hong. 194. 1861; Hook. f., Fl. Brit. India 3: 395. 1881; Gamble, Fl. Pres. Madras 730(513). 1921; Fyson, Fl. South Indian Hill St. 3: t. 401. 1920. **(PLATE 12: 108)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Slender scapigerous herbs, 50-80 cm high. Leaves 10-15 cm long, basal or basal and cauline, membranous; terminal lobe larger and obtuse, crenate, glabrous or thinly puberulus; petiole to 6 cm long. Heads 6 x 3 mm, numerous on large slender terminal panicle; bracts 2-seriate, 5 x 1 mm, glabrous, inner ones smaller. Flowers yellow, bisexual, similar, all ligulate; corolla 5 mm long, tube slender, limb 5-toothed, glandular; stamens 5, excerted, anthers sagittate at base. Achenes 2 x 1 mm, ribbed, beaked, scabrous, brown.

Flowering & Fruiting: October - April.

Notes: Found in shola floor and border, sheltered places etc. ± 2050 m, common in Sispara.

PSU & NKK, Wenlockdowns, 30.01.1991, b 15 & Botanical Garden, 25.03.1991, c 76 (Cairn Hills); PSU & NKK, Kodanad, 05.10.1994, 189 (TNFDH).

12. BALSAMINACEAE

IMPATIENS L.

Section 1. Scapigerae

Scapigerous plants with tuberous rootstock; leaves all radical; flowers racemose; seeds very minute, clothed with spiral hairs.

1. Lip with a very long incurved spur 2
1. Lip spurless; leaves cordate; flowers reddish-brown; wing petals 3-lobed, lobes broad, rounded .... *I. orchioides*

2. Spur of lip incurved.......... 3
2. Spur of lip straight .... *I. modesta*

3. Spur tip inflated; leaves not glabrous, orbicular or reniform, apex not narrowed .... *I. clavicornu*
3. Spur cylindric; leaves glabrous, broadly ovate, cordate at base, acute at apex .... *I. levingei*

Section 2. Epiphyticae

Epiphytic perennial herbs, succulent, with very short simple or sparingly branched, often annulate or articulate, stems; leaves alternate, usually fascicled at the ends of branches; flowers on simple or branching few-flowered peduncles; wings very short, thick, almost concealed in the mouth of the tip and concave standard.

Lip scarlet; sepals linear, green; standard green, dorsally broadly winged .... *I. parasitica*

Section 3. Annuae

Annual herbs; leaves opposite; flowers pedicelled, solitary binate or fascicled in the axils of the leaves, without peduncle; ebracteate or minutely bracteates at base; sepals elongate, linear, rarely ovate or lanceolate; seeds glabrous, usually globose, black.

1. Sepals linear or linear-lanceolate; seeds black and shining 2
1. Sepals ovate or ovate-lanceolate; seeds various .... *I. gardneriana*

2. Spur of lip slender, usually longer than the wings, sometimes shorter or zero 3
2. Spur of lip very short or zero 4

3. Stem stiff, usually simple; leaves broad or narrow, coriaceous .... ***I. chinensis***
3. Stem slender, flaccid; wings long stipitate, basal lobe minute or zero, dorsal auricle zero, leaves elliptic to lanceolate .... ***I. minor***

4. Lip scapiform or cymbiform, spur of lip very minute or zero; flowers white or rose, very small .... ***I. inconspicua***
4. Lip saccate; often pubescent **5**

5. Lip with a short upcurved spur .... ***I. tomentosa***
5. Lip spurless .... ***I. rufescens***

Section 4. Microsepalae

Shrubs or herbs; leaves opposite, alternate or rarely whorled; flowers pedicelled, the pedicels solitary binate or fascicled in the axils of the leaves, without peduncle; sepals small or minute; seeds smooth, rugose or pappilose.

1. Leaves 5.5 cm long; petiole short; stem reddish; lip yellow .... ***I. leschenaultii***
1. Leaves 12 cm long; petiole long; stem often with sulphury covering; lip white .... ***I. latifolia***

Section 5. Tomentosae

Shrubby, leaves alternate, hairy on both surfaces; flowers pedicelled, the pedicels solitary in the axils of the leaves without peduncle, ebracteate; standard and lip tomentose.

Flowers very large, white, wings large .... ***I. hensloviana***

Section 6. Subumbellatae

Herbs or shrubs; leaves opposite or alternate rarely whorled; flowers umbellate or in very contracted racemes terminating a long axillary peduncle; pedicels bracteates at the base.

1. Shrubs or large branching herbs **2**
1. Annual herbs **3**

2. Spur longer than the limb of the tip; sepals orbicular .... ***I. fruticosa***
2. Spur shorter than limb of the lip or zero; sepals ovate................................ ***I. campanulata***

3. Leaves opposite .... ***I. goughii***
3. Leaves alternate .... ***I. cordata***

Section 7. Racemosae

Shrubs; leaves alternate; flowers in elongate peduncled axillary racemes; pedicels bracteate at the base; sepals orbicular or broadly oblong; lip spurred; seeds various.

Leaves long petioled, ovate; distal lobe of wings sessile; lip tubiform, incurved throughout its length .... ***I. phoenicea***

115. Impatiens campanulata Wight, Madras J. Lit. Sci. ser. 1, 5: 11. t. 7. 1837; Hook. f., Fl. Brit. India 463. 1874; Gamble, Fl. Pres. Madras 143(102). 1915; Fyson, Fl. South Indian Hill St. 1: 69. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 52.1983; Vivek. et al. in Hajra et al., Fl. India 4:130.1997. **(PLATE 13: 109)**

Common names: Thottachinungi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Outskirts of sholas.

Subshrubs, nodes swollen, succulent. Leaves alternate, broad-elliptic, to 15 x 6 cm, glabrous, base cuneate, margin serrate-dentate, apex acuminate; petiole to 4 cm. Inflorescence subumellate, axillary, to 5 flowered; peduncle to 6 cm. Flowers 2.5 x 1.6 cm; pedicel to 3 cm. Sepals glabrous; laterals ovate, 1.5 x 0.8 cm; odd one boat shaped 0.8 x 2cm; spur clavate, short or than of lip, 5 mm, not curved. Petals white with reddish throat, odd one orbicular, 1.5 x 1.8 cm, appendaged; laterals obovate, 1.3 x 1.2 cm; lobes sub equal. Stamens 5. Capsule 1.8 x 0.6 cm; seeds 18, with short trichimes.

Flowering & Fruiting: June - September.

*Notes:*Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 1800 m, common in Naduvattam.

116. Impatiens chinensis L., Sp. Pl. 937. 1753: Gamble, Fl. Pres. Madras 139(99). 1915; Fyson, Fl. South Indian Hill St. 2: t. 49. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 52.1983; Vivek. et al. in Hajra et al., Fl. India 4: 131. 1997. *Impatiens chinensis* L. var. *brevicornis* E. Barnes, J. Indian Bot. Soc. 18: 99. 1939; Vivek. et al. in Hajra et al., Fl. India 4:121.1997. **(PLATE 13: 110)**

Common names: Machinga, Oonapoovu, Pily, Paily (M); Vashtla, Pylee (T).

Distribution: India and China. *Habitat*: Moist places in shola forests.

Annual herbs, 10-60 cm high; stems erect from a prostrate rooting base, angled, glabrescent or villous. Leaves opposite, 3-7 x 0.5-1.5 cm, linear-oblong or lanceolate, acute or rounded at base, serrate at margin, villous above, glaucous beneath, pinkish-nerved; subsessile; stipules subulate, recurved, glandular; pedicels 3-5 cm long, deflexed in fruit. Flowers axillary, solitary or in fascicles, 1.2-2.5 cm across, rose or pink. Lateral sepals linear or falcate, acute with a callous point, ca 8 mm long. Lip

cymbiform, ca 1.2 x 0.7 cm, slender, incurved; spur to 3.5 cm long. Standard orbicular, acuminate or horned. Wings orbicular or obovate, auricled at base. Capsules ellipsoid, tapering at both ends, 1.2-1.8 cm long; seeds oblong, shining, black.

Flowering & Fruiting: October - May.

Utility: Used in Folk medicine. Plant is used as an external application to burns.

Notes: Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 2100 m, common in Pykara.

KNS, Bank of Mayor River, 09.02.1963, 87 (FRC).

117. Impatiens clavicornu Turcz., Bull. Soc. Imp. Naturalis. Moscou 32: 271. 1859; Fyson, Fl. South Indian Hill St. 2: t. 47. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 52.1983; Vivek. et al. in Hajra et al., Fl. India 4: 133. 1997. *Impatiens beddomei* Hook.f., Fl. Brit. India 1: 442. 1874; Gamble, Fl. Pres. Madras 138(98).1915. **(PLATE 13: 111)**

Distribution: Endemic to Western Ghats. *Habitat*: Rock crevices in grasslands.

Herbs, 10-20 cm high; rootstock tuberous. Leaves radical, fleshy, orbicular or reniform-cordate, entire or obscurely crenate-serrate at margin, 2.5-8 cm across; nerves flabellate; petioles 2.5-8 cm long. Scape longer than leaves to 15 cm long; bracts ovate; pedicels slender, to 2.5 cm long. Flowers in racemes, ca 1.2 cm across, pink. Lateral sepals obliquely ovate. Spur ca 1 cm long, incurved, inflated at tip. Standard broader than long. Wings with 3 subequal truncate retuse lobes. Capsules ellipsoid, ca 8 mm long; seeds minute, clothed with spiral hairs.

Flowering & Fruiting: June - October.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

118. Impatiens cordata Wight, Madras J. Lit. Sci. ser. 1, 5: 10. 1837; Hook. f., Fl. Brit. India 1: 462. 1874; Gamble, Fl. Pres. Madras 144(103). 1915; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 52.1983; Vivek. et al. in Hajra et al., Fl. India 4: 135. 1997. **(PLATE 13: 112)**

Common names: Thottachinungi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Near water courses in Shola forests.

Annual herbs, stem prostrate and rooting at nodes. Leaves ovate-cordate, acuminate, sparsely hairy along nerves, to 5 cm across; petiole to 3 cm long. Flowers in axillary umbellate, 3-5 flowered racemes, peduncle 5-7 cm long. Flowers 2.5 cm long, pink with purple shade at the centre. Sepals ovate-acuminate. Standard emarginate, lateral lobes of wing incurved, terminal lobes orbicular. Lip boat-shaped, spur slender, incurved.

Flowering & Fruiting: December - March.

Notes: Found in the ecotone region of sholas ± 1950 m, common in Porthimund.

119. Impatiens fruticosa Lesch. ex DC., Prodr. 1: 687.1824; Hook. f., Fl. Brit. India 1:459.1874; Gamble, Fl. Pres. Madras 143(102). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 298.1920; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 53.1983; Vivek. et al. in Hajra et al., Fl. India 4: 149. 1997. **(PLATE 13: 113)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Subshrubs. Leaves to 9 x 4 cm, ovate-elliptic, acute at apex, cuneate at base, glabrous or glabrescent, serrate, stipular glands at the base of the lamina; petiole to 3.5 cm. Sub-umbel axillary; peduncle to 5 cm; flowers white, 2.5 cm across; bracts slender, to 5 mm; sepals ovate, cuspidate. Fruit 1.5 cm, ellipsoid.

Flowering & Fruiting: January - April.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Western Catchment.

120. Impatiens gardneriana Wight, Ic. t. 1050. 1846; Hook. f., Fl. Brit. India 1: 445. 1874; Gamble, Fl. Pres. Madras 141(101). 1915; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 53.1983; Vivek. et al. in Hajra et al., Fl. India 4: 150. 1997. *Impatiens setosa* Hook.f. & Thoms., J. Linn. Soc. Bot. 4: 123. 1860; Hook. f., Fl. Brit. India 1: 445. 1874. **(PLATE 13: 114)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Annual, 30-40 cm high; stems creeping at base and rooting, ascending, branched or not. Leaves opposite and whorled, ovate-oblong or elliptic-lanceolate, cuneate at base, serrate at margin, acuminate at apex, 3-12 x 1-4 cm, ciliate at margin towards base, sparsely pubescent; petioles 1.2-3.5 cm long, pubescent. Peduncles filiform, 2-3.5 cm

long, glabrous. Flowers axillary, solitary or in fascicles, ca 2.5 cm across, pink. Lateral sepals ovate or ovate-lanceolate, acuminate, ciliate. Lip cymbiform; spur curved upwards, ca 1.8 cm long, slender. Standard suborbicular-obovate, apiculate, dorsally keeled. Wings 2-lobed; lobes obovate, distal lobe larger. Capsules terete, ca 1.5 cm long; seeds hairy.

Flowering & Fruiting: July - November.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Upper Bhavani.

121. Impatiens goughii Wight, Illustr. 1: 160. 1840; Hook. f., Fl. Brit. India 1: 452. 1874; Gamble, Fl. Pres. Madras 144(102). 1915; Fyson, Fl. South Indian Hill St. 2: t. 55. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 53.1983; Vivek. et al. in Hajra et al., Fl. India 4: 152. 1997. *Impatiens anamallayensis* Bedd., Ic. t. 150. 1868-1874. *Impatiens microtheca* Hook.'s Ic. Pl. 30: t. 2910. 1910. **(PLATE 13: 115)**

Distribution: Endemic to Western Ghats. *Habitat*: On wet rocks in grasslands.

Annual herbs, 5-30 cm high; stems simple or branched. Leaves opposite, 1.5-3.5 x 0.8-1.5 cm, ovate, subacute at apex, crenate-serrulate along margins, glabrous, rarely hairy below; petioles up to 2 cm long. Flowers in terminal subumbels, pale pink; peduncles 2-5 cm long; pedicels up to 1.5 cm long; bracts persistent, minute, lanceolate. Lateral sepals falcate, ca 2 mm long. Lip cymbiform; spur shorter than wings, straight. Standard obovate, mucronate at the refuse apex. Wings bilobed; basal lobes oblong, rounded at apex; distal lobes longer than basal ones; dorsal auricle produced into the spur. Capsules ellipsoid, 3-5 mm long; seeds 6-12, almond-shaped, chestnut-coloured, granular with hairs.

Flowering & Fruiting: July - December.

Notes: Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 2050 m, common in Pykara.

122. Impatiens hensloviana Arn., Comp. Bot. Mag. 1:322.1836; Hook. f., Fl. Brit. India 1:458.1874; Gamble, Fl. Pres. Madras 143(102). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 297.1920; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 54.1983; Vivek. et al. in Hajra et al., Fl. India 4: 155. 1997. *Impatiens albida* Wight, Madras J. Lit. Sci. ser. 1, 5: 7. 1837 & Ic. t. 743. 1844. **(PLATE 13: 116)**

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Shrubs, stem with prominent leafscars. Leaves to 9 x 3 cm, lanceolate, acuminate, base cuneate, serrate, with stipitate glands at the base of the lamina, pubescent; petiole to 3 cm, ebracteate. Flowers solitary, white, pedicels to 9 cm; lip to 2 cm, pubescent; spur to 1.5 cm, laterals ovate, mucronate; petals 3.5 cm, white. Capsule ellipsoid, puberulus; seeds papillose.

Flowering & Fruiting: August - October.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1850 m, common in Manjoor.

123. Impatiens inconspicua Benth. ex Wight & Arn., Prodr. 139. 1834; Hook. f., Fl. Brit. India 1: 447. 1874; Fyson, Fl. South Indian Hill St. 2: t. 50. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 54.1983; Vivek. et al. in Hajra et al., Fl. India 4: 158. 1997. *Impatiens inconspicua* Benth. ex Wight & Arn. var. *filiformis* (Wight & Arn.) Hook. f., Fl. Brit. India 1: 448. 1874. *Impatiens inconspicua* Benth. ex Wight & Arn. var. *ramosissima* (Dalz.) Hook.f., Fl. Brit. India 1: 448. 1874. *Impatiens pusilla* var. *nematostachys* Hook.f., Bull. Misc. Inform. Kew 1910: 294. 1910. *Impatiens pusilla* Heyne ex Hook. f. & Thoms., J. Linn. Soc. Bot. 4: 122. 1859; Gamble, Fl. Pres. Madras 140(100). 1915.

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Flaccid glabrous herbs. Leaves distantly serrate, basal ones ovate, upper linear, sparsely hairy above, glabrous below. Flowers solitary or in pairs, 1 cm long; pedicels slender, pubescent, to 1 cm long. Sepals linear, subulate with terminal lobes of wings broadly obovate, clawed, laterals linear. Lip saccate. Spur absent. Seeds globose, black, shining.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas ± 2150 m, common in Dodabetta.

124. Impatiens latifolia L., Sp. Pl. 937. 1753; Hook. f., Fl. Brit. India 1: 450. 1874; Fyson, Fl. South Indian Hill St. 2: t. 54. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 54.1983; Vivek. et al. in Hajra et al., Fl. India 4: 169. 1997. *Impatiens bababudenensis* Hook.f., Bull. Misc. Inform. Kew 1910: 295. 1910. **(PLATE 13: 117)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Erect, fleshy shrub, 20-50 cm high; stems branched. Leaves alternate, subopposite or whorled, often crowded at ends of branches, ovate-lanceolate, crenate-serrate at margin, acuminate or caudate-acuminate at apex, 5-11 x 2-3.5 cm, membranous, glandular at lower margin; petioles 2-5 cm long, glandular. Pedicels slender, 2-6 cm long, often recurved in fruit. Flowers solitary, 2-nate or in fascicles, purple or red. Lateral sepals ovate, cuspidate, small or minute. Lip cymbiform, cucullate, acuminate; spur straight or incurved, slender, 1.2-1.8 cm long, white. Standard larger than wings, 2-lobed, spurred on dorsal side. Wings 2-lobed; basal lobe smaller. Capsules ellipsoid, 1.8-2.4 cm long; seeds obovoid, rugose or papillose.

Flowering & Fruiting: July - November.

Utility: Used in Folk medicine.

Notes: Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 2100 m, common in Wood house.

PSU & NKK, Kodanad, 17, 11. 1994, 525 & 13.10.1995, 345 (TNFDH).

125. Impatiens leschenaultii (DC.) Wall. ex Wight & Arn., Prodr. 136. 1834; Hook. f., Fl. Brit. India 1: 450. 1874; Gamble, Fl. Pres. Madras 141(101). 1915; Fyson, Fl. South Indian Hill St. 2: t. 53. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 55.1983; Vivek. et al. in Hajra et al., Fl. India 4: 173. 1997. *Balsamina leschenaultii* DC., Prodr. 1: 586. 1824. **(PLATE 14: 118)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Undershrubs, 1-1.5 m high. Leaves opposite, alternate or whorled, ovate-lanceolate or elliptic, crenate at margin sometimes ciliate in sinuses, acute or acuminate at apex, 2.5-12.5 x 1.2-4 cm; nerves 4-6 pairs; petioles to 5 cm long, glandular in upper half. Pedicels to 4 cm long. Flowers solitary, 2-nate or in fascicles, white with yellow tinge. Lateral sepals ovate-lanceolate, ca 3 mm long. Lip cymbiform, 5-7 mm long, yellow; spur incurved, slender, 1-2.2 cm long. Standard suborbicular, spurred on dorsal side. Wings 2-lobed; basal lobe smaller. Capsules ellipsoid, beaked, ca 1.2 cm long, 3-5 seeded; seeds obovoid, ca 3 mm long, rugose or papillose, dark purplish brown.

Flowering & Fruiting: April - December.

Notes: Found on moist, exposed slopes of sholas ± 2100 m, common in Dodabetta.

KNS, Longwood, 08.05.1963, 498 (FRC).

126. Impatiens levingei Gamble ex Hook. f., Rec. Bot. Surv. India 4:45.1906; Gamble, Fl. Pres. Madras 138(98). 1915; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 55.1983. **(PLATE 14: 119)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Small herbs; stem very small or absent. Leaves few, to 5 x 6 cm, broadly ovate, deeply cordate at base, acute at apex, distantly serrate, glabrous; petiole to 11 cm long. Scape 15-18 cm long, 1-3-together. Flowers few, white, confined towards the apex of the scape; pedicel 1.5 cm long, filiform, glabrous; bracts 2 mm long, ovate; lip 4.5 x 3 mm, ovate, concave, acute; spur 5 mm long, cylindrical, straight, glabrous; wings 9 mm long, lobes obtuse. Capsule 6-8 mm long; seeds 1.2 x 0.6 mm, glandular-hairy, reddish brown.

Flowering & Fruiting: August - November.

Notes: Found in the ecotone region of sholas ± 1400 m, common in Dolphin nose.

127. Impatiens minor (DC.) Bennet, Indian J. For. 2: 283. 1979; Vivek. et al. in Hajra et al., Fl. India 4: 181. 1997. *Balsamina minor* DC., Prodr. 1: 686. 1824. *Impatiens kleinii* Wight & Arn., Prodr. 140.1834; Hook. f., Fl. Brit. India 1:445.1874; Gamble, Fl. Pres. Madras 140(100).1915; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 54.1983. **(PLATE 14: 120)**

Distribution: Peninsular India. *Habitat*: Shola forests.

Slender glabrous branched herbs. Leaves elliptic-lanceolate, or oblong-obovate, acute or acuminate, base acute, serrulate, with a pair of stalked glands at the base, to 5 x 2 cm; petiole to 5 mm long. Flowers pink-violet, 8 mm across; pedicels slender, 1-1.5 cm long, deflexed in fruits. Sepals linear-subulate; spur slender, to 1.5 cm long. Standard petal orbicular; wings broadly ovate, entire, clawed. Capsule linear, 2 cm long; seeds black.

Flowering & Fruiting: August - December.

Utility: Used in Folk medicine.

Notes: Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 2200 m, common in Sispara.

128. Impatiens modesta Wight, Madras J. Lit. Sci. ser. 1, 5: 13. 1837; Hook. f., Fl. Brit. India 1: 442. 1874; Gamble, Fl. Pres. Madras 138(98). 1915; Fyson, Fl.

South Indian Hill St. 2: t. 48. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 55.1983; Vivek. et al. in Hajra et al., Fl. India 4: 182. 1997. **(PLATE 14: 121)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Stemless herbs. Leaves 4-5 x 5 cm, broadly ovate, acute at apex, cordate at base, serrate, pubescent below; petiole to 10 cm long, 2-5-together. Scapes 20 cm long. Flowers 8-9 mm across, confined to the tip of the scape; bracts ovate, cordate at base; pedicels 1.5 cm long; lip 4 x 2.5 mm, ovate, obtuse; spur 4 mm long, straight, cylindrical, obtuse; sepals 2 x 1 mm, ovate; standard 3.5 x 4 mm, broadly ovate, obtuse, glabrous, entire; wings 6.5 mm long, lobes subequal, oblong, obtuse.

Flowering & Fruiting: April - September.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

129. Impatiens orchioides Bedd., Madras J. Lit. Sci. ser. 3, 1: 44. 1864 & Ic. t. 152. 1868-1874; Gamble, Fl. Pres. Madras 139(99). 1915; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 55.1983; Vivek. et al. in Hajra et al., Fl. India 4: 188. 1997.

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Epiphytic, scapigerous herbs; roots tuberous. Leaves radical, 1.5-5.5 x 1-6 cm, ovate-orbicular, deeply cordate at base, obtuse or acuminate at apex, bristly crenate along margins, hairy above, with numerous weak hairs, almost glabrous beneath; petioles 2-16 cm long. Scapes 5-19 cm long, 6-10 flowered at apex; bracts ovate; pedicels very slender, 1-1.5 cm long. Flowers ca 8 mm across, reddish-brown or pale brown. Lateral sepals ovate, acute. Lip ovate, acute, saccate, spurless. Standard ovate, obtuse, not vaulted; wings with a dimidiate oblong blade produced into two linear, pendulous lobes. Capsules constricted at both ends, glabrous; seeds numerous, minute, scrobiculate, brown.

Flowering & Fruiting: August - October.

Notes: Found as epiphytic on shola trees ± 1900 m, common in Avalanche.

130. Impatiens parasitica Bedd., Madras J. Lit. Sci. ser. 2, 20: 66. t.7. f.2. 1859 & Ic. t. 140. 1868-1874; Gamble, Fl. Pres. Madras 139(99). 1915; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 56.1983; Vivek. et al. in Hajra et al.,

Fl. India 4: 191. 1997. *Impatiens jerdoniae* Wight var. *parasitica* (Bedd.) Hook.f., Fl. Brit. India 1: 460. 1874. **(PLATE 14: 122)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Epiphytic herbs, stem fleshy with prominent leafscars, wrinkled. Leaves clustered at apex, to 4 x 2.5 cm, ovate, crenate, acute at apex, rounded at the base; petiole to 2 cm. Cymes 2-4-flowered, axillary; flowers 2 cm long, scarlet; spur striate, broad, obtuse; sepals green, acute; wings 2-lobed, lower lobe larger, flat, enter into the spur of the lip, red; standard green.

Flowering & Fruiting: June - November.

Notes: Found as epiphytic on shola trees ± 2100 m, common in Ankinda.

131. Impatiens phoenicea Bedd., Madras J. Lit. Sci. ser. 2, 19: 175. 1858 & Ic. t. 30. t.148. 1868-74; Hook. f., Fl. Brit. India 1: 466. 1875; Gamble, Fl. Pres. Madras 145(103). 1915; Fyson, Fl. South Indian Hill St. 2: t. 56. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 56.1983; Vivek. et al. in Hajra et al., Fl. India 4:193.1997. **(PLATE 14: 123)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Erect, suffruticose herbs, 30 - 100 cm high, branched or not. Leaves alternate, ovate-lanceolate, crenate-serrate at margin, with cilia in crenatures, 5-10 x 2-3.5 cm, membranous; petioles 1.5-2 cm long. Flowers in axillary racemes, scarlet; bracts cordate, ca 5 mm long, persistent; pedicels slender, ca 1 cm long. Lateral sepals obliquely ovate. spur trumpet-shaped, incurved with a swollen tip, stout; standard ovate, dorsally winged; wings 2-lobed; basal lobe cordate, overlapping, larger, oblong distal one. Capsules 4 or 5 seeded; seeds compressed, ca 3 mm long, furrowed.

Flowering & Fruiting: September - October.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Sispara.

132. Impatiens rufescens Benth. ex Wight & Arn., Prodr. 138.1834; Gamble, Fl. Pres. Madras 1871(1295). 1936; Fyson, Fl. South Indian Hill St. 2: t. 51. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 56.1983; Vivek. et al. in Hajra et al., Fl. India 4: 206. 1997. *Impatiens tomentosa* Heyne ex Wight & Arn. var. *rufescens* (Benth. ex Wight & Arn.) Hook.f., Fl. Brit. India 1: 449. 1874.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Swampy areas.

Terrestrial herbs, 10-25 cm high; stems erect, glabrous. Leaves opposite, 3-5 cm long, elliptic or cordate- obovate, cauline, acute or acuminate at apex, serrate, hispid above, hairy on nerves beneath, shortly petiolate; petioles when not flattened and decurrent on stems. Flowers ca 2 cm across, axillary, solitary, rose-pink or purplish, binate or fascicled, epedunculate; pedicels about the length of leaves, villous. Lateral sepals 0.8 x 2.5 cm, linear, hairy, smaller than wings. Lip saccate, without spur, bottom of lip not with a small pit. Standard rose-pink, orbicular, apiculate, distinctly keeled, mucronate, not bigger than all other petals and sepals. Wings 2-lobed; basal lobes rounded, distal lobes larger than basal ones. Capsules ovoid, 1 cm long; seeds dark brown, smooth and shining.

Flowering & Fruiting: July - November.

Notes: Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 2200 m, common in Pykara falls.

133. Impatiens tomentosa Heyne ex Wight & Arn., Prodr. 139. 1834; Hook. f., Fl. Brit. India 1: 449. 1874; Gamble, Fl. Pres. Madras 141(100). 1915; Fyson, Fl. South Indian Hill St. 2: t. 52. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 56.1983; Vivek. et al. in Hajra et al., Fl. India 4: 217. 1997. **(PLATE 14: 124)**

Distribution: Endemic to Western Ghats. *Habitat*: Wet rocky areas.

Herbs, stem reddish, tomentose. Leaves 6 x 1.5 cm, oblong or lanceolate, acute at apex, truncate to cordate at base, margin distantly serrate, pubescent. Flower axillary, solitary, white, 1 cm across; pedicels to 1.5 cm, tomentose; sepals pubescent; lip 7 mm, saccate; spur to 7 mm, curved, pubescent. Capsule to 8 mm, ovoid; seeds glabrous, black, shining.

Flowering & Fruiting: June - September.

Notes: Found in the moist, shady shola floor, dripping rocks, stream bank etc. ± 2050 m, common in Parsons valley.

KNS, Bangitappal, 12.05.1963, 639 (FRC).

13. BERBERIDACEAE

1. Small trees; leaves imparipinnate; berry globose .... *Mahonia*
1. Shrubs; leaves simple, crowded; berry spindle shaped .... *Berberis*

BERBERIS L.

134. Berberis tinctoria Lesch., Mem. Paris 9: 306. 1822; Gamble, Fl. Pres. Madras 32(23). 1915; Fyson, Fl. South Indian Hill St. 2: t. 10. 1932; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 9.1983; R.R. Rao & B.D. Naithani in B. D. Sharma et al., Fl. India 1: 386. 1993. **(PLATE 14: 125, 125 a)**

Common names: Oosipazham (T).

Distribution: India, Afghanistan and Bhutan. *Habitat*: Shola border.

Erect shrubs, variable in size and form, often 1-2 m high, in forests to 4 m high; stems furrowed, pale brown; wood very tough, bright yellow; spines 3-fid, 1.5-3 cm long. Leaves obovate, entire, rarely with 1 or 2 spinules, obtuse, mucronate, 1.5-3.5 x 0.7-1.3 cm, thick, purplish when young, papillose, dull above, pruinose beneath; petioles 2-5 mm long. Flowers in 10-20 flowered racemes or panicles, 3.5-5 cm long, yellow; pedicels 5-10 mm long, red. Prophylls ca 1 x 0.5 mm. Outer sepals obovate, acute, ca 7 x 5 mm; the inner ovate or obovate, obtuse, ca 4 x 2.5 mm. Petals obovate, ca 6 x 4.5 mm, clawed; claws glandular at base. Stamens ca 5 mm long, short apiculate. Ovary stipitate. Berries spindle shaped, 9-10 x ca 5 mm excluding 1-1.5 mm long dry style and large round stigma still attached, purplish red turning dark blue with glaucous bloom.

Flowering & Fruiting: February - June.

Utility: Used in Folk medicine and in colouring tablets. Fruits are edible.

Propagation: Fruits are immersed in water over night, depulped. The separated seeds are dried, mixed with sand and sown in well prepared mother bed for obtaining even germination. Germination is noticed between 20 and 30 days normally and is about 40 %. Seedlings at 2 -3 leaf pair stage can be transplanted in about 60-70 days. After transplanting when seedlings reach a height of 60 to 70 cm they are ideal for out planting. Seeds are viable for three months.

Notes: Found in the ecotone region of sholas ± 2200 m, common in Pykara.

PSU & NKK, Kodanad, 02.03.1994, 001 (TNFDH); KNS, Dodabetta, 09.02.1963, 31(FRC).

135. Mahonia leschenaultii (Wall. ex Wight & Arn.) Takeda ex Gamble, Fl. Pres. Madras 32(23). 1915; Fyson, Fl. South Indian Hill St. 2: t. 12. 1932; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 9.1983; Guha Bakshi in B. D. Sharma et al., Fl. India 1: 410. 1993. *Berberis leschenaultii* Wall. ex Wight & Arn., Prodr. 16. 1834. *Berberis nepalensis* Spreng. in L., Syst. Veg. (ed.16) 2: 120. 1825, var. *leschenaultii* Hook. f. & Thoms. in Hook.f., Fl. Brit. India 1: 109. 1872. **(PLATE 15: 126)**

Common names: Tarike (K); Manjanathi, Maramanjal, Mullukadambu, Mullumanjanathi (M); Charayapazham, Mullu-kadambu (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Evergreen trees, 4-7 m tall; bark light brown, corky, vertically and horizontally fissured; blaze sulphur yellow. Leaves compound, imparipinnate, verticelled at the tips of branches; rachis 17-33 cm, slender, glabrous, base sheathing with 2 subulate stipules; leaflets 7-17, opposite, sessile; lamina 3-9 x 1-5 cm, ovate, ovate-lanceolate or oblong-ovate; base obliquely truncate, rounded, subcordate or very obtuse; apex cuspidate; margin spinose, glabrous, rigid, coriaceous, shining above, pale beneath; 3-5 nerved from the base, raised beneath; secondary laterals 3-5 pairs, pinnate; intercostae reticulate, faint. Flowers bisexual, yellow, in racemes generally fascicled at the apices of stem, in umbel fashion, erect or oblique, often paniculate, 7.5-40 cm; pedicels 6-16 mm, with 2-3 appressed bracts; sepals 6, imbricate in 2 series. Petals 6, imbricate in 2 series; nectaries distinct. Stamens 6, free, anthers-cells opening by recurved valves. Ovary single celled; ovules 5-6, basal, erect; style stout; stigma peltate. Fruit a berry, 8 mm across, broadly ellipsoid-globose, purple, pruinose, bitter, 3-5 seeded.

Flowering & Fruiting: June - December.

Utility: Used in Folk medicine.

Propagation: The seeds have to be sown immediately after the collection for best germination because of poor viability. The matured violet coloured fruits are immersed in water for overnight and depulped for the collection of fresh seeds. Then dried seeds are mixed with sand and sown for germination. Germination is noticed from 30 to 40 days. Germination is about 40%.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Dodabetta. Fruits are edible.

14. BETULACEAE

ALNUS Miller.

136. Alnus nepalensis D. Don, Prodr. Fl. Nepal. 58. 1825; Hook. f., Fl. Brit. India 5: 600. 1888; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 257.1987. **(PLATE 15: 127)**

Common names: Alnus (E).

Distribution: Himalaya and China. *Habitat*: Planted.

Deciduous trees; branchlets glabrous, spreading, winter buds stalked. Leaves simple, alternate, stipulate; stipules free, sheathing, caducus; petiole 7-30 mm long, glabrous, stout, swollen at base, grooved above; lamina 7.5-20 x 5-10.2 cm, elliptic, ovate-oblong; base acute or oblique; apex acute; margin entire, glabrous, glaucous beneath, coriaceous; lateral nerves 10-18 pairs, pinnate, prominent; intercostae scalariform. Flowers unisexual, green; male flowers in 10-25 mm long spikes in terminal drooping panicle, flowers in clusters of 6-12; bracts 3-flowered, with 3-5 adnate bracteoles; perianth 4 lobed. Stamens 4, mixed with ciliate scales under each bracts; anthers subsessile. Female flowers in short erect spikes, 6 mm long, flowers pendulous, bracteoles 2-4, minute; perianth absent; ovary 2-celled, superior; ovule 1 in each cell; styles 2, stigma producing beyond bracteoles. Fruit a strobilate spike, bracts persistent, 1.5-2 x 0.7-1 cm, woody, oblong, bracts persistent, seeds winged, 4 x 3 mm, surmounted by the persistent style.

Flowering & Fruiting: January - June.

Utility: Used in Folk medicine.

Notes: Planted along roadsides etc. ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.02.1991, a 34 (Cairn Hills).

15. BORAGINACEAE

CYNOGLOSSUM L.

137. Cynoglossum zeylanicum (Vahl ex Hornem.) Thunb. ex Lehm., Neue Schriften Naturf. Gen. Halle 3:20. 1817; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 98.1987. *Anchusa zeylanica* Vahl ex Hornem., Hort. Hafn. 3. 1807. *Cynoglossum denticulatum* A.DC. var. *zeylanicum* (Vahl ex Hornem.) Clarke in

Hook.f., Fl. Brit. India 4: 157. 1883; Gamble, Fl. Pres. Madras 900 (632). 1923. *Cynoglossum furcatum* Wall. in Roxb., Fl. Ind. 2: 6. 1824; Hook. f., Fl. Brit. India 4: 155. 1883; Gamble, Fl. Pres. Madras 900(632). 1923; Fyson, Fl. South Indian Hill St. 2: t. 195. 1932. **(PLATE 15: 128)**

Common names: Ceylon Forget Me Not (E); Kayooram, Mudichilooram (M); Pisinottarai (T).

Distribution: Indo-Malesia and China. *Habitat:* Along roadsides.

Erect herbs, to 1 m tall, whole plant softly adpressed pubescent. Leaves alternate, 10-25 x 3-7 cm, oblong-lanceolate, acute at apex, cuneate at base; nerves to 5 pairs, prominent, arching, upper leaves smaller; petiole to 1 cm long, flat. Racemes 10-35 cm long, straight or arching. Flowers sessile, many; sepals 5, 2 mm long, spreading; corolla 3-5 mm across, blue, campanulate; stamens 5, inserted at the throat of the corolla tube; ovary 4-celled, style gynobasic. Fruit of 4 nutlets, 3-5 mm across, glochidiate.

Flowering & Fruiting: August - October.

Utility: Used in Folk, Siddha medicine. Roots are used as a tonic and rejuvenator.

Notes: Found in the open areas and roadsides ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, b 77 (Cairn Hills); PSU & NKK, Kodanad, 30.03.1994, 39 & 14.08.1994, 342 (TNFDH); KNS, Kundah, 12.05.1963, 604 (FRC).

16. BRASSICACEAE (CRUCIFERAE)

1. Leaves entire lobed or pinnate leaves; pods linear .... *Cardamine*
1. Leaves in a rosette or pinnatifid; pods flat, broad 2

2. Leaves decumbent, pods with rounded top .... *Coronopus*
2. Leaves simple, rosette at base; pods triangular .... *Capsella*

CAPSELLA Medikus

138. Capsella bursa-pastoris (L.) Medik., Pfl.-Gatt. 85. 1792; Hook. f., Fl. Brit. India 1: 159. 1872; Gamble, Fl. Pres. Madras 38(27). 1915; Fyson, Fl. South Indian Hill St. 2: t. 16. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 11.1983; Bhaumik in in B.D. Sharma & N.P. Balakr., Fl. India 2: 189. 1993. *Thlaspi bursa-pastoris* L., Sp. Pl. 647. 1753. **(PLATE 15: 129)**

Common names: Shepherd's purse (E).

Distribution: Cosmopolitan except the Tropics. *Habitat*: Roadsides and Cultivated lands.

Annual herbs, sparsely branched, erect, to 30 cm high, glabrous. Basal leaves 6-14 x 2-3.5 cm, short-stalked, rosulate, oblong-lanceolate or spathulate, pinnatipartite; cauline ones 1-7 x 0.2-2 cm, ovate-lanceolate, amplexicaul, serrate-dentate or entire, acute at apex. Racemes congested at anthesis, much elongate at maturity, to 25 cm long in fruit; pedicels spreading to horizontal. Sepals oblong, obtuse, ca 2 x 1 mm, usually green. Petals 4, spreading, lanceolate, 2-3 x 0.5-1 mm, white. Fruits obcordate to 3-angled, laterally compressed, scarcely attenuate at base, slightly emarginate at apex with a wide apical notch, 5-9 x 3.5-6 mm; seeds numerous, minute, ca 1 mm long, reddish brown to black.

Flowering & Fruiting: March - October.

Utility: Used in Folk and Homeopathy medicine.

Notes: Weed of cultivation, of courtyards ± 2150 m, common in Ooty.

PSU & NKK, Kodanad, 14.07.1994, 97 & 14.11.1994, 334 (TNFDH).

CARDAMINE L.

1. Lower leaves 3-foliolate; pods 4 cm long .... *C. africana*
1. Lower leaves more than 5-foliolate; pods 1-2 cm long .... *C. hirsuta*

139. Cardamine africana L., Sp. Pl. 655. 1753; Hook. f., Fl. Brit. India 1: 137. 1872; Gamble, Fl. Pres. Madras 38(27). 1915; Fyson, Fl. South Indian Hill St. 2: t. 13. 1932; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 11.1983; Hajra & H.J. Chowdhery in B.D. Sharma & N.P. Balakr., Fl. India 2: 109. 1993. *Cardamine borbonica* Pers., Syn. 2: 195. 1806. **(PLATE 15: 130)**

Common names: Kaadu saasuve (K).

Distribution: Temperate and Subtropical Africa. *Habitat*: Cultivated lands.

Weak herbs to 15 cm high, branches scarce. Leaflets 4 x 2 cm, lyrate, glabrous above, sparsely hairy below; petiole 5 cm long, slender. Raceme terminal, few-flowered. Flowers 8 mm across, pedicellate; sepals linear; petals 5 mm long, clawed; stamens 6, tetradynamous, filaments glabrous. Pod 4 cm long; seeds 2 x 0.5 mm, narrowly oblong, smooth.

Flowering & Fruiting: Throughout the year.

Notes: Weed of cultivation, of courtyards ± 2200 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.10.1991, b 24 (Cairn Hills); PSU & NKK, Kodanad, 26.06.1994, 78 (TNFDH); KNS, Longwood, 08.05.1963, 485 (FRC).

140. Cardamine hirsuta L., Sp. Pl. 655. 1753; Hook. f., Fl. Brit. India 1: 158. 1872; Gamble, Fl. Pres. Madras 38(27). 1915; Fyson, Fl. South Indian Hill St. 2: t. 14. 1932; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 11.1983; Hajra & H.J. Chowdhery in B.D. Sharma & N.P. Balakr., Fl. India 2:112.1993. **(PLATE 15: 131)**

Distribution: Cosmopolitan. *Habitat*: Cultivated lands.

Herbs, to 30 cm high; stems erect or creeping at base, glabrous or sparsely hairy. Leaves alternate, very variable, 3-25 x 1-20 mm, glabrous or hairy. Basal leaves in a rosette, imparipinnate, petioled; leaflets 5-13, orbicular or ovate, irregularly toothed or lobed, 5-15 mm across; cauline ones petioled or subsessile; leaflets lanceolate, narrowly oblong or obovate, toothed or irregularly lobed, rounded at apex, 5-25 x 1-15 mm. Inflorescences racemose or subcorymbose, 10-20 flowered, to 20 cm long. Flowers 3-5 mm across. Sepals oblong, obtuse, ca 2 mm long. Petals ovate, cuneate, rounded, 2.5-5 mm long, white. Stamens 4, rarely 6. Ovary many-ovuled. Fruits cylindric, somewhat compressed, 15-25 x ca 1 mm; seeds 6-12 on either side of septum, ca 1 mm long.

Flowering & Fruiting: November - December.

Notes: Weed of cultivation, of courtyards ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 27.01.1991, b 25 (Cairn Hills).

CORONOPUS Wall.

141. Coronopus didymus (L.) Smith, Fl. Brit. 2: 691. 1800; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 11.1983; Bhaumik in B.D. Sharma & N.P. Balakr., Fl. India 2: 192. 1993. *Lepidium didymum* L., Mant. Pl. 1: 92. 1767. *Senebiera didyma* (L.) Pers., Syn. 2: 185. 1800; Gamble, Fl. Pres. Madras 39(28). 1915. **(PLATE 15: 132)**

Common names: Lesser Wart-cress, Swine cress (E).

Distribution: Cosmopolitan. *Habitat*: Cultivated lands.

Diffuse or procumbent herb, 15- 40 cm long; stems angled, sulcate, much branched from base, spreading and ascending. Lower leaves long-petioled, deeply pinnatipartite, 7-10 x 1.5-2 cm, often glabrous; segments lobed, few-toothed; cauline ones much smaller. Racemes 30-60 flowered, dense, 3-5 cm long in fruit. Flowers small; pedicels filiform, to 5 mm long. Sepals ovate-orbicular, minute. Petals linear, ca 0.5 mm long, greenish white. Fertile stamens 2. Fruits emarginate at base, notched at apex, reticulate, 1.5-1.7 x 2-2.5 mm; style much included within notch; seeds reniform, ca 1 mm long, punctate-striate, pale brown.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Weed of cultivation, of courtyards ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 22.02.1991, b 26 (Cairn Hills); PSU & NKK, Kodanad, 14.11.1994, 351 (TNFDH).

17. BURMANNIACEAE

BURMANNIA L.

142. Burmannia candelabrum Gagnep., Bull. Soc. Bot. Fr. 54:462.1907; Hajra in Nayar et al., Fasc. Fl. Ind. 19: 7. 1988; S.R. Srinivas. in A.N. Henry et al., Fl. Tamil Nadu 3: 3.1989. *B. candida* Griff. ex Hook.f., Fl. Brit. India 5: 665. 1888; C.E.C. Fischer in Rec. Bot. Surv. India 9 (1): 173. 1921; Fyson, Fl. South Indian Hill St. 2: t. 241. 1932. *B. coelestris* sensu Fischer in Gamble, Fl. Pres. Madras 3: 1442 (1008). 1928. **(PLATE 15: 133)**

Distribution: India and Bangladesh. *Habitat*: Marshy areas.

Saprophytic herbs, stem 6-20 cm high, filiform, simple or branched. Leaves reduced to scales ca 2 mm long, appressed, lanceolate, acute. Flowers white, solitary or a few on curved branches, 8-10 mm long, prominently 3-winged, usually blue; bracts ca 2 mm long, lanceolate. Outer perianth lobes without lateral lobes, ovate, rounded, with a thick fleshy bag on inner side. Inner lobes small, lanceolate. Perianth-tube ca 2 mm long, cylindrical. Connective oblong, with 2 lateral arms; crests two, acute, divergent; spur basal, acute. Ovary 4-6 mm long, obovoid to clavate, style filiform; stigmas funnel-shaped, sessile. Capsule obovoid or clavate.

Flowering & Fruiting: August - November.

Notes: Found in the marshy region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Pykara Water Falls, 26.01.1991, a 55 (Cairn Hills).

18. BUXACEAE

1. Scandent shrubs, leaves elliptic, 15 x 6 cm, base 3-ribbed .... ***Sarcococca***
1. Small tree; leaves oblong, 5 x 1 cm, vemation not 3-ribbed .... ***Buxus***

BUXUS L.

143. Buxus papillosa C. Schneider, Ill. Handb. Laubholzk. 2: 139.1907; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 242.1987. *B. sempervirens* sensu Hook.f., Fl. Brit. India 5: 267. 1887, non l. 11753; Gamble, Fl. Pres. Madras 866 (598). 1923. *Buxus wallichiana* Baill., Monogr. Bux. et. Styloc. 63. 1859. **(PLATE 15: 134)**

Common names: Kattuchempakam (Tamil); White Champak (English)

Distribution: South Europe, West Asia and North Africa. *Habitat*: Cultivated as a hedge plant.

Monoecious, ever green, compact shrubs; branchlets angled. Leaves decussate, oblong-lanceolate, to 2.5 x 1.3 cm thick coriaceous, base at apex obtuse; petiole 0.2 cm. Inflorescence of sessile clusters 6 mm vide in upper axis. Male flowers numerous towards the periphery. Perianth of imbricte lobes. Stamens 4, exseted; filaments free. Female flowers single, apical on raceme. Perianth-lobes 6, imbricate. Ovary superior, 3 celled; ovules 2 per cell, axile placentae; style prominent; stigma spreading. Capsule woody, 2-valved; seeds carunculate, ovoid, 5x3 mm, smooth, back with fissures.

Flowering & Fruiting: March- May.

Utility: Used in Folk and Homeopathy medicine.

Notes: Planted as a hedge plant ± 2100 m, common in Ooty.

PSU & NKK, Wenlockdowns, 14.03.1991, a 06 (Cairn Hills).

SARCOCOCCA Lindly

144. Sarcococca saligna (D. Don) Muell.-Arg. in DC., Prodr. 16:11. 1869; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 243.1987. *Buxus saligna* D. Don, Prodr. Fl. Nepal. 63. 1825. *Sarcococca pruniformis* Lindl., Bot. Reg. 12: t. 1012.

1826 p.p.; Hook. f., Fl. Brit. India 5: 266. 1887; Fyson, Fl. South Indian Hill St. 2: t. 235. 1932 p.p. *Sarcococca trinervia* Wight, Ic. t. 1877. 1852; Gamble, Fl. Pres. Madras 1265(885). 1925. **(PLATE 16: 135)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Scandent shrubs. Leaves alternate, to 18 x 8 cm, elliptic, acuminate, 3-ribbed from base. Flowers unisexual, in axillary racemes. Male racemes 1-2 cm long. Flowers densely packed; bracts ovate; bracteoles 4, opposite, paired; perianth lobes 4, 2 x 2 mm, ovate, acute, stamens 4, free, antitepalous. Female racemes smaller, few-flowered, bracteoles many; tepals 6, ovate, ciliate; ovary 3-celled, globose, glabrous, ovules 2 in each cell; styles 2. Berry 7 x 7 mm, globose, black.

Flowering & Fruiting: December - February.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 26.01.1991, a 26 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 319 & 04.11.1994, 229 (TNFDH).

19. CAESALPINIACEAE (LEGUMINOSAE)

1. Prostrate slender herbs .... *Chamaecrista*
1. Softly tomentose shrubs 2

2. Rambling shrubs, armed .... *Caesalpinia*
2. Erect shrubs, unarmed .... *Senna*

CAESALPINIA L.

145. Caesalpinia decapetala (Roth) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 89. 1931; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 11.1983; Sanjappa, Legumes Ind. 11. 1992. *Richardia decapetala* Roth, Nov. Pl. Sp. 212. 1821. *Caesalpinia sepiaria* Roxb., Fl. Ind. 2: 360. 1832; Hook. f., Fl. Brit. India 2: 256. 1878; Gamble, Fl. Pres. Madras 394(279). 1919; Fyson, Fl. South Indian Hill. St. 3: t. 321.1920. **(PLATE 16: 136)**

Common names: Black bonduc, Mysore thorn, Shoofly (E); Gajjiga, Kurudu gejjuga (K); Inna (M); Sirukalacchi, Putthadukki (T).

Distribution: Originally from Tropical and Subtropical Asia; now widely naturalized.

Habitat: Evergreen forests.

Rambling shrubs; branchlets tomentose. Leaves to 30 x 20 cm, bipinnate; leaflets to 15 x 6 mm, oblong, obtuse, densely hispid. Racemes terminal, to 25 cm long. Flowers many, 2.5 cm across; bracts 7 x 3 mm, lanceolate; sepals 10 x 4 mm, oblong, obtuse; petals yellow, equal, orbicular; filaments 12 mm long, densely bearded. Pods to 7 x 2.2 cm, elliptic-oblong, flat, glabrous, 2 or 3-seeded.

Flowering & Fruiting: January - February.

Utility: Used in Folk medicine.

Notes: Naturalised in the shola border ± 1800 m, common in Kalhatty.

CHAMAECRISTA Moench

146. Chamaecrista nictitans (L.) Moench ssp. **patellaria** (Collad.) Irwin & Barneby var. **glabrata** (Vogel) Irwin & Barneby, Mem. New York Bot. Gard. 35: 822. 1982; V. Singh, Monogr. Indian Subtribe Cassiinae 73. 2001. *Cassia patellaria* Collad. var. *glabrata* Vogel, Syn. Gen. Cass. 66. 1837. *Cassia leschenaultiana* DC., Mem. Soc. Phys. Hist. Nat. Geneva 2: 132. 1824; Gamble, Fl. Pres. Madras 403(286). 1919; Fyson, Fl. South Indian Hill. St. 3: t. 322.1920; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 130.1983. *Chamaecrista leschenaultiana* (DC.) Degner, Fl. Haw. Fam. 169b. 1934. *Cassia mimosoides* L. ssp. *leschenaultiana* (DC.) Ohashi, J. Jap. Bot. 50: 308. 1975. **(PLATE 16: 137)**

Common names: Mimosa- like senna (E); Avarekkachedi (M).

Distribution: Pantropical. *Habitat*: Grasslands.

Prostrate slender herbs; branchlets densely hispid. Leaves about 10 cm long; leaflets up to 40 pairs, oblong-elliptic, 6 x 1 mm, chartaceous, glabrous, apex and base obtuse, margin entire, apiculate. Flowers yellow, axillary, solitary or 2-3-fascicled. Pods short stipitate, flat, strap-shaped, 5 x 0.5 cm, sericious, tomentose, obtuse, dehiscent; seeds up to 20, ellipsoid.

Flowering & Fruiting: August - October.

Notes: Found in grasslands ± 1800 m, common in Naduvattam.

SENNA Miller

1. Leaves with glands on petiole or rachis; leaflets 3-5 pairs; pod cylindrical.......***S. septemtrionalis***
1. Leaves without glands; leaflets more than 8 pairs; pods flat ....***S. didymobotrya***

147. Senna didymobotrya (Fresen.) Irwin & Barneby, Mem. New York Bot. Gard. 35: 467. 1982; V. Singh, Monogr. Indian Subtribe Cassiinae 131. 2001. *Cassia didymobotrya* Frasen., Flora 22: 53. 1839; Matthew, Rec. Bot. Surv. India 20: 77. 1969; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 129.1983. **(PLATE 16: 138)**

Common names: Popcorn Cassia, Peanut Butter Senna (E).

Distribution: Native of Tropical East Africa, introduced elsewhere. *Habitat*: Grown as garden plant, also as an escape in the High Ranges.

Large shrubs; branches pubescent. Leaves alternate, rachis (including petiole) 25-45 cm long, terete; leaflets 8-17 pairs, 1-5.5 x 0.4-2 cm, oblong or elliptic-oblong, sometimes ovate-oblong to narrowly obovate, oblique at base, rounded-mucronate at apex, pilose on margins, pinninerved, petioles 3-8 cm long, pubescent; petiolules ca 1 mm long; stipules broadly ovate, foliaceous, 1-1.5 cm long, cordate-auriculate at base, reflexed, pubescent. Glands solitary or in groups, linear-subulate, between all pairs of leaflets or totally absent. Flowers in erect, 20-50 cm long, spike like racemes, axillary; peduncles 5-8 cm long, terete, pubescent; bracts 1-1.5 cm long, ovate, enclosing buds; bracteoles absent. Sepals narrowly ovate, 1-1.3 cm long. Petals delicately veined, 1.5-2.5 cm long, ovate or obovate, shortly clawed, yellow. Fertile stamens 7; anthers spurred at base, two almost semilunar, rest straight with recurved neck, staminodes 3, anther-like. Ovary stipitate, silky tomentose; style glabrous, recurved; stigma punctiform. Pods 5-9 x 1.8-2.2 cm, linear-oblong, flat, stipitate, beaked, brown-black, dehiscing along sutures; seeds 10 to 14 flat, oblong; areole 4-5 x 1 mm, in the middle of each face; testa with reticulate or concentric striations.

Flowering & Fruiting: October - March.

Notes: Naturalised in the shola border ± 1800 m, common in Aravankadu.

148. Senna septemtrionalis (Viv.) Irwin & Barneby var. **pubescens** (V. Singh) V. Singh, Monogr. Indian Subtribe Cassiinae 190. 2001. *Cassia floribunda* Cav. var. *pubescens* V. Singh, J. Econ. Tax. Bot. 10: 326. 1987. *Senna floribunda* (Cav.) Irwin & Barneby var. *pubescens* (V. Singh) V. SIngh, J. Econ. Tax. Bot. 16: 600. 1992. **(PLATE 16: 139)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Along road sides in disturbed forests.

Shrubs, up to 1.5 m tall, profusely branching above middle of main stem; branches terete, pubescent when young, glabrescent with maturity. Leaves alternate, 5-foliolate, rarely 3-foliolate, 10-18 cm long; rachis 6.5-9 cm long including 2-3.2 cm long petiole; interjugal parts 1.5- 2 cm long, sulcate above, glabrescent; leaflets (3) 5 pairs, smaller towards base, 2-5.7 x 0.6-1.3 cm, ovate-elliptic to lanceolate, acute at apex, pubescent above and below, stipules linear-lanceolate, pubescent; glands between all leaflet pairs except between terminal pair, ovate-conical, 1.5 x 0.5 mm, sessile, pubescent petiolules pubescent. Corymbs axillary and terminal; peduncles 3-7 cm long, densely pubescent; bracts 6-9 x 1.5 mm, elliptic-lanceolate, densely pubescent. Sepals unequal, 5-11 x 4-6 mm, ovate to elliptic, obtuse at apex, pubescent. Petals 15- 20 x 7-10 mm, yellow. Fertile stamens 7; 2 longest anthers 7-8 x 1.5 mm, filaments 10 mm long; others 4-5 x 1 mm, filaments 3-4 mm long. Pistil 13-15 mm long, incurved, glabrous; stipe 2 mm long, pubescent; ovary 8 x 2 mm, 10 to 12-ovuled; style ca 5 mm long. Pods 7.5-9.5 x 0.6-0.9 cm, oblong, acuminate at apex with style remain, thickened on both sutures, pubescent; seeds 4 to 10, 5.5 x 3.5 x 2 mm, spermoderm with linear markings, hilum 0.5 mm long.

Flowering & Fruiting: July - May.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

20. CAMPANULACEAE

WAHLENBERGIA Schrader ex Roth

149. Wahlenbergia marginata (Thunb.) A. DC., Monogr. Campan. 143. 1830; R. Chandras. in Henry et al., Fl. Tamil Nadu 2: 56.1987. *Campanula marginata* Thunb., Fl. Jap. 89. 1784. *Wahlenbergia gracilis* (G. Forst.) Schrad. ex A.DC., Monogr. Campan. 142. 1830; Hook. f., Fl. Brit. India 3: 429. 1881; Gamble, Fl. Pres. Madras 738(519). 1921; Fyson, Fl. South Indian Hill St. 2: t. 175. 1932. *Campanula gracilis* G. Forst., Insul. Austr. Prodr. 84. 1786. *Wahlenbergia agrestis* A.DC., Monogr. Campan. 145. 1830. **(PLATE 16: 140)**

Distribution: Africa, Asia, Australia and New Zealand. *Habitat*: Grasslands.

Small herbs; rootstock perennial. Leaves to 6 x 0.8 cm, bigger at base, minutely toothed or entire, strongly one-nerved, strigose below. Flowers solitary or in binate cymes; calyx tube 4-5 mm long, ribbed, lobes erect, linear-lanceolate; corolla widely campanulate; petals 10 x 4 mm. Capsule obconical; seeds ellipsoid, dark brown.

Flowering & Fruiting: December - March.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, b 23 (Cairn Hills); PSU & NKK, Kodanad, 10.07.1994, 253 (TNFDH).

21. CAPRIFOLIACEAE

1. Flowers small, regular; stigma lobed .... ***Viburnum***
1. Flowers large, irregular; stigma capitate .... ***Lonicera***

LONICERA L.

1. Climbing shrubs; leaves glabrous, greenish; flowers fragrant .... ***L. leschenaultii***
1. Erect shrubs; leaves pubescent, purplish; flowers not fragrant .... ***L. ligustrina***

150. Lonicera leschenaultii Wall. in Roxb., Fl. Ind. 2: 178. 1824; Hook. f., Fl. Brit. India 3: 10. 1880; Gamble, Fl. Pres. Madras 577(407). 1919; Fyson, Fl. South Indian Hill St. 2: t. 135. 1932; R. Rajan in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 184.1983. **(PLATE 16: 141)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Climbing shrubs, pubescent. Leaves opposite, to 7 x 4 cm, ovate, fragrant, acute or shortly acuminate, grey pubescent below; petiole to 1 cm. Flowers axillary, fragrant, mostly in pairs, white turns to yellow, bracteoles 2, pubescent. Calyx tube 2 mm, adnate with the ovary, 5-toothed. Corolla bilabiate, tube 6 cm long, villous inside. Stamens 5, exserted, attached at the throat of tube, filaments 2.5 cm. Ovary 2 mm, villous.

Flowering & Fruiting: October - December.

Notes: Climbing on shola trees; found in shola border ± 1200 m, common in Kalhatty.

PSU & NKK, Wenlockdowns, 26.01.1991, a 12 (Cairn Hills); PSU & NKK, Kodanad, 05.07.1994, 91 (TNFDH); KNS, Naduvattam, 13.05.1963, 268 (FRC).

151. Lonicera ligustrina Wall. in Roxb., Fl. Ind. 2: 179. 1824; Wight, Ic.t. 1025. 1845; Hook. f., Fl. Brit. India 3: 12. 1880; Gamble, Fl. Pres. Madras 578(408). 1919; Fyson, Fl. South Indian Hill St. 2: t. 136. 1932; R. Rajan in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 184.1983. **(PLATE 16: 142)**

Distribution: Khasi Hills, Nepal, Bhutan, China and Western Ghats. *Habitat*: Shola border in marshy areas.

Erect bushy shrubs with grey bark; branches numerous, ascending, tufted; the youngest from a persistent sheath of decussate budscales, pubescent and purplish. Leaves opposite, to 3-5 x1 cm; petiole 3-5 mm long; ovate, entire; in bud erect and flat; when young purplish with distinctly revolute and ciliate margin; when older spreading and quite smooth. Flowers in cymes on the young shoots in opposite pairs, pendent; peduncle of a pair 5 cm, axillary bracteoles 1-2 mm linear. Calyx-tube subglobose, 0.2 cm, limb with a refluxed ring below the lobes; lobes 4, triangular, with reddish glands along margins. Corolla cream, gibbous at the base; tube 0.8 cm; lobes 5, oblong-orbicular, 3-4 mm, imbricate. Stamens 5. Ovary 3-celled; style 1 cm, puberulous below; stigma 3 lobed. Drupes combined, broadly ovoid, 7 x 5 mm.

Flowering & Fruiting: January - August.

Notes: Found in stream banks, along shola border ± 2200 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, a 13 (Cairn Hills); KNS, Cairon hill, 18.03.1969, 3556 (FRC).

VIBURNUM L.

1. Leaves and petiole reddish; flowers in drooping panicles .... ***V. erubescens***
1. Leaves and petiole greenish; flowers in erect umbels **2**

2. Leaves without punctate scales beneath; corolla tubular .... ***V. coriaceum***
2. Leaves with punctate scales beneath; corolla rotate .... ***V. punctatum***

152. Viburnum coriaceum Blume, Bijdr. 656. 1826; Hook. f., Fl. Brit. India 3: 5. 1880; Gamble, Fl. Pres. Madras 576(407). 1919; R. Rajan in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 184.1983. *Viburnum hebanthum* sensu Wight, Ic. t. 1023. 1845, non Thw. 1859; Fyson, Fl. South Indian Hill St. 2: t. 134. 1932. **(PLATE 16: 143)**

Common names: Elasaande (K); Mottumookkan (M); Badaga, Kadambu (T).

Distribution: India, Bhutan, Myanmar and Indonesia. *Habitat*: Shola border.

Evergreen trees, to 7 m high, bark grey. Leaves simple, opposite, estipulate; petiole 10-40 mm long, slender, grooved above, glabrous; lamina 6.4-17.5 x 2.5-5.5 cm, elliptic, obovate, ovate-lanceolate or elliptic-lanceolate, base acute or obtuse, apex acuminate, margin entire or slightly serrate, glabrous, chartaceous; lateral nerves 4-6 pairs, pinnate, prominent, domatia present. Flowers bisexual, white, 3 mm across, in terminal or

subterminal umbellate corymbs; bracteoles deciduous. Calyx tube 2 mm long, pubescent, lobes 5, persistent, obtuse. Corolla tube 4 mm long, tubular, glabrous; lobes 5, short, ovate-obtuse, erect, ciliate. Stamens 5, inserted on the corolla tube; filaments short. Ovary inferior, oblong, 1-celled, ovules 1, pendulous; style short, stigma 3 lobed. Fruit a drupe 8 x 5 mm, elliptic, compressed, ribbed, beaked, reddish-brown; seed one, 6 x 4 mm, elliptic.

Flowering & Fruiting: May - September.

Utility: Used in Ayurveda medicine.

Propagation: Seeds are viable for 2 weeks. Healthy matured red coloured drupes are soaked in water, depulped and dried. Seeds were sown in well prepared mother bed. 30 % germination is noticed from 35 to 45 days.

Notes: Found on slopes, by shola border ± 900 m, common in Gethai.

PSU & NKK, Porthimund, 15.02.1991, a 15 (Cairn Hills); PSU & NKK, Kodanad, 28.10.1995, 228 (TNFDH); KNS, Kundah, 12.05.1963, 616 (FRC).

153. Viburnum erubescens Wall. ex DC., Prodr. 4: 329. 1830; Hook. f., Fl. Brit. India 3: 7. 1880; Gamble, Fl. Pres. Madras 576(407). 1919; Fyson, Fl. South Indian Hill St. 3: t. 354. 1920; R. Rajan in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 184.1983. *Viburnum wightianum* Wight & Arn., Prodr. 388. 1834. **(PLATE 17: 144, 144a)**

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Large shrubs. Leaves decussate, 12 x 8 cm, ovate, oblong, acute, serrate; nerves 4-6 pairs, intercostae transverse, axils villous; petiole 1.5 cm long. Panicles to 6 x 4 cm, drooping. Flowers white, pedicelled; calyx lobes ovate, acute; corolla 6 mm long, urceolate; filaments inserted at the throat of corolla tube; ovary 1-celled; styles 3. Drupe 10 x 4 mm, obovoid, truncate with persistent calyx; seeds obovoid, rugose.

Flowering & Fruiting: February – May.

Propagation: Seeds are viable for 2 weeks. Well matured healthy seeds are soaked in water for overnight the outer seed coats are separated then seeds are broad casted over mother bed. 30 % germination is noticed from 50 to 60 days.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 14.07.1994, 95 (TNFDH); KNS, Cairon hill, 18.03.1969, 3669 (FRC).

154. Viburnum punctatum Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 142. 1825; Hook. f., Fl. Brit. India 3: 5. 1880; R. Rajan in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 184.1983. *Viburnum acuminatum* Wall. ex DC., Prodr. 4: 325. 1830; Gamble, Fl. Pres. Madras 575(406). 1919; Fyson, Fl. South Indian Hill St. 2: t. 132. 1932. **(PLATE 17: 145)**

Common names: Kadukatha (K); Konakkara, Konakarimaram (M); Konakaram (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Trees, to 12 m high, bark greyish-brown, blaze dull-red with narrow darker streaks; young parts and inflorescence covered by minute peltate scales. Leaves simple, opposite, estipulate; petiole 5-20 mm, grooved above, slender, peltate scaly; lamina 3.5-13 x 1-5 cm, elliptic, elliptic-obovate, or elliptic-lanceolate, base acute, apex acute or acuminate, margin entire, recurved, glabrous above, coriaceous; lateral nerves 5-10 pairs, pinnate, prominent. Flowers bisexual, white, 5 mm across, in terminal umbellate corymbs; bracteoles persistent; calyx tube 2 mm long; lobes 5, obtuse; corolla rotate, shortly tubular, 2.5 mm long, white, pubescent; lobes 5, ovate, obtuse, spreading; stamens 5, inserted on the corolla tube; filaments erect; anthers oblong-cordate; ovary inferior, 1-celled, oblong, ovule 1, pendulous; style short, stigma broadly 3 lobed, decurrent, subsessile. Fruit a drupe 8 x 5 mm, ovoid, punctate, reddish-brown, crowned with persistent style; seed one, compressed, ventrally concave.

Flowering & Fruiting: January - August.

Utility: Used in Ayurveda medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

KNS, Benne RF, 13.02.1963, 121 (FRC).

22. CARYOPHYLLACEAE

1. Leaves orbicular-ovate, 3-5 nerved .... *Drymaria*
1. Leaves linear or linear-spathulate, 1-nerved or whorled 2

2. Sepals united .... *Silene*
2. Sepals free 3

3. Styles free 4
3. Styles united 5

4. Capsules long, often curved .... *Cerastium*
4. Capsules short, erect .... *Stellaria*

5. Leaves linear-lanceolate more than 5 cm long .... *Spergula*
5. Leaves obovate to spathulate, less than 1.5 cm long .... *Polycarpon*

CERASTIUM L.

1. Flowers shorter than the pedicel .... *C. indicum*
1. Flowers longer than the pedicel .... *C. glomeratum*

155. Cerastium glomeratum Thuill., Fl. Env. Paris ed. 2: 226. 1799; Fyson, Fl. South Indian Hill St. 2: t. 26. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 22.1983; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2:523.1993.*Cerastium vulgatum* L., Fl. Suec. ed. 2: 158. 1755,p.p. *Cerastium vulgatum* var. *glomeratum* (Thuill.) Edgew. & Hook. f., Fl. Brit. India 1: 228. 1874. **(PLATE 17: 146)**

Distribution: India, Bhutan and Nepal. *Habitat*: Weed along the roadsides and degraded forest areas in the high ranges.

Annual herbs, 10-45 cm high, glandular-pubescent; flowering shoots erect or ascending. Leaves subsessile, 10-25 x 6-9 mm, oblong, lanceolate, ovate, obovate or elliptic, basal ones sometimes spathulate, obtuse at base, entire and ciliate at margin, obtuse and apiculate at apex, white-hairy. Cymes clustered; flowers lax; bracts lanceolate, ca 5 x 3 mm, hairy; pedicels 2-5 mm long. Sepals lanceolate, acuminate at apex, 4-5 x 1-1.5 mm, pubescent. Petals 2-fid, much longer than sepals, white. Stamens 5(-10). Capsules cylindric, curved above, 8-11 mm long, scarious, straw-coloured, dehiscing by 10 straight teeth; seeds ovoid, ca 0.5 x 0.3 mm, rugose-tubercled, pale brown.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Weed of cultivation ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 23.02.1991, b 34 (Cairn Hills); PSU & NKK, Kodanad, 25.11.1995, 390 (TNFDH).

156. Cerastium indicum Wight & Arn., Prodr. 43. 1834; Hook. f., Fl. Brit. India 1: 227. 1874; Gamble, Fl. Pres. Madras 61(44). 1915; Fyson, Fl. South Indian Hill St. 2: t. 25.1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 22.1983; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2:524.1993. **(PLATE 17: 147)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Decumbent, slender, glandular-pubescent herbs. Leaves decussate, lanceolate or obovate-oblong, 2-3.5 x 0.5-1 cm, subchartaceessile, subsessile; stipules 0. Cymes terminal and also axillary, dichotomous; branchlets diverging, less than 10-flowered. Sepals 5, lanceolate, 5 mm. Petals 5, 2-fid, white, elliptic, exceeding sepals. Stamens 10. Capsule 6 mm ovoid, teeth recurved; seeds many, tubercled.

Flowering & Fruiting: September - February.

Utility: Used in Folk medicine.

Notes: Found in the shola border ± 2050 m, common in Pykara.

DRYMARIA Willd. ex Schultes

157. Drymaria cordata (L.) Willd. ex Roem. & Schult. ssp. **diandra** (Blume) Duke, Ann. Miss. Bot. Gard. 48: 253. 1961; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 23.1983. *Drymaria diandra* Blume, Bijdr. 62. 1825; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2: 533.1993. *Drymaria cordata* Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1: 244. 1874 p.p.; Gamble, Fl. Pres. Madras 63(46).1915. *Cerastium cordifolium* Roxb., Fl. Ind. 2: 458. 1832. **(PLATE 17: 148)**

Common names: Pipili (E).

Distribution: Paleotropics. *Habitat*: Cultivated lands.

Diffuse prostrate herbs, rooting at the nodes. Leaves to 1.5 x 1 cm, rounded or ovate, base cordate, or subtruncate, puberulus, membranous; petiole to 3 mm; stipular hairs interpetiolar. Cymes axillary or terminal, to 5 cm; sepals 3 mm, lanceolate, green, 3-nerved; petals 2mm, bifid at apex; stamens 3-5, filaments 1.5 mm; ovary globose, 1 mm across, style 3 fid. Capsule 2.5 mm, oblong.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Weed of cultivation ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 29.01.1991, I b 38 (Cairn Hills); PSU & NKK, Kodanad, 14.08.1994, 302 (TNFDH); KNS, Thorappally, 09.02.1963, 71 (FRC).

POLYCARPON L.

158. Polycarpon tetraphyllum (L.) L., Syst. Nat. ed. 20. 881. 1759; Gamble, Fl. Pres. Madras 65(46). 1915; Fyson, Fl. South Indian Hill St. 3: t. 289. 1920; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 23.1983. *Mollugo tetraphylla* L., Sp. Pl. 89. 1753. **(PLATE 17: 149)**

Distribution: Native of Central Europe and Mediteranean. Now a cosmopolitan weed. *Habitat*: Shola border.

Annual, slender, much branched, herbs, suberect or ascending, 3-15 cm high, glabrous with rough angles. Leaves usually in whorls of 4, shortly petiolate, obovate to spathulate, cuneate at base, obtuse at apex, 8-13 x 4-6 mm, glabrous, green; stipules ovate to triangular, 2.5-3 mm long, scarious. Cymes dichotomous, compact. Flowers 2-3 mm across. Sepals 1.5-2.5 x 1 mm, green, broadly scarious-margined. Petals narrowly oblong, emarginate, deciduous, white. Stamens 3-5. Capsules ovoid, ca 1.5 mm long; seeds minute, brownish, finely papillose.

Flowering & Fruiting: Throughout the year.

Notes: Weed of cultivation ± 2000 m, common in Pykara.

SILENE L.

159. Silene gallica L., Sp. Pl. 440. 1753; Hook. f., Fl. Brit. India 1: 218. 1874; Gamble, Fl. Pres. Madras 63(45). 1915; Fyson, Fl. South Indian Hill St. 2: t. 24. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 24.1983; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2: 578. 1993.

Distribution: Central and South Europe, North Africa, Turkey to Iran. *Habitat*: Open areas and wastelands.

A branched, viscid herb; branchlets ascending. Leaves opposite, spathulate to oblanceolate, to 3 x 1 cm, base narrowed, apex mucronulate. Racemes one sided, to 8 flowered. Calyx tubular, glandular, 10- striate, 5-toothed, contracted above. Petals 5, entire, white to pinkish spreading above, with narrow claws and 2 erect scales at the throat. Stamens 10; filaments villous below. Disc produced into short gynophores. Ovary 1-3 celled; ovules numerous; style 3 capsules ovoid, 1 x 0.6 cm, opening with teeth. Seeds reniform.

Flowering & Fruiting: Throughout the year.

Notes: Weed of cultivation ± 2050 m, common in Dodabetta.

PSU & NKK, Kodanad, 11.03.1994, 24 & 14.11.1994, 99 (TNFDH).

SPERGULA L.

160. Spergula arvensis L., Sp. Pl. 440. 1753; Hook. f., Fl. Brit. India 1: 243. 1874; Gamble, Fl. Pres. Madras 63(45). 1915; Fyson, Fl. South Indian Hill St. 2: t. 27. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 24.1983; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2: 578. 1993. **(PLATE 17: 150)**

Common names: Cornspurry (E); Thadikeerai (T).

Distribution: Cosmopolitan. *Habitat*: A weed in Potato fields.

Erect, branched herbs; branchlets clustered at base. Leaves opposite, appearing whorled, linear, dissected, to 3 x 0.4 cm, glabrous, sessile, canaliculate; base obtuse, sheathing, apex acute; stipules in whorls, ovate, 1 x 1 mm. Cymes in terminal dichasia to 15 cm, many flowered; peduncle to 8 cm. Flower to 3 mm wide; pedicel to 2 cm. Sepals 5, free, lanceolate, 3 x 1 mm, glandular without. Petals 5, white, entire, ovate, 3 x 1.5 mm. Stamens 5; filaments subulate, flat; anthers ovoid. Ovary globose, 1-celled; ovules numerous, axile; styles 5, free, recurved. Capsule globose, 5 x 5 mm, 5-valved; seeds numerous, ovoid.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine. This plant is used for making curries along with dal and potato.

Notes: Weed of cultivation ± 2100 m, common in Pykara.

PSU & NKK, Ooty, 24.03.1991, b 40 (Cairn Hills).

STELLARIA L.

161. Stellaria media (L.) Vill., Hist. Pl. Dauph. 3: 615.1789; Hook. f., Fl. Brit. India 1: 230. 1874; Gamble, Fl. Pres. Madras 62(45). 1915; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 24.1983; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2: 585. 1993. *Alsine media* L., Sp. Pl. 272. 1753. **(PLATE 17: 151)**

Distribution: Cosmopolitan. *Habitat*: Shola border.

Erect or diffuse herbs; stem tomentose. Leaves opposite, to 2 x 1.5 cm, ovate, acute, glabrous, lateral nerves form a clear intramarginal vein; petioles 2-3 mm long. Flowers solitary; axillary and terminal; pedicel 1.5 cm long. Sepals 3 x 1 mm, oblong, hairy outside. Petals 5, 1.3 mm long, 2-fid to base, white. Stamens 10, free. Ovary 1-celled, ovules few, basal; styles 3, curved, tubercled. Capsule 3 mm long, ovoid; seeds 4-8, 1.2 x 1.2 mm, reniform, tuberculate.

Flowering & Fruiting: Throughout the year.

Utility: Used in Homeopathy medicine.

Notes: Found in the fallow fields ± 1800 m, common in Naduvattam.

PSU & NKK, Dodabetta, 11.02.1991, b 42 (Cairn Hills); PSU & NKK, Kodanad, 02.03.1994, 06 (TNFDH).

23. CELASTRACEAE

1. Leaves alternate 2
1. Leaves opposite 3

2. Plants armed, shrub .... *Maytenus*
2. Plants unarmed, straggler .... *Celastrus*

3. Ovary 1-3 celled; fruits drupes .... *Cassine*
3. Ovary 4 or 5 celled; fruits capsules 4

4. Flowers sessile, in axillary clusters .... *Microtropis*
4. Flowers pedicelled, in dichasial cymes .... *Euonymus*

CASSINE L.

162. Cassine paniculata (Wight & Arn.) Lobr.-Callen, Adansonia ser. 2. 15: 220. 1976; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 72.1983. *Elaeodendron paniculatum* Wight & Arn., Prodr. 157. 1834; Gamble, Fl. Pres. Madras 212(152). 1918. *Elaeodendron glaucum* sensu Lawson in Hook. f., Fl. Brit. India 1: 623. 1875 p.p. non Pers. 1805. **(PLATE 18: 152)**

Common names: Bigalae, Kannumara, Mookurichi, Kannrige (K); Thannimaram (M); Karuvali, Kanniramaram, Kheeri, Veeri, Selupa (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Trees, to 20 m high; bark grey, smooth; blaze red; branchlets slender, terete. Leaves simple, opposite, decussate; stipules minute, cauducous; petiole 8-15 mm, slender,

grooved above, glabrous; lamina 7-9 x 2.5-4 cm, elliptic-oblong, obovate, oblanceolate, lanceolate or ovate-lanceolate, base acute or cuneate, apex acute or obtusely-acuminate, margin crenate, glabrous, coriaceous; lateral nerves 6-8 pairs, pinnate, prominent, intercostae reticulate, slender, faint. Flowers bisexual, greenish-yellow, 1 cm across, in axillary stout dichasial corymbose cymes. Calyx 5-lobed, lobes unequal, imbricate. Petals 5, obovate, spreading. Stamens 5, inserted into the margin of the disc; filaments slender at length recurved; anthers subglobose; disc thick, fleshy, margin sinuate. Ovary immersed in the disc, conical, 2-5-celled, ovules 2 in each cell; style short; stigma small. Fruit a drupe, 2.5 x 1.5 cm, globose to ellipsoid, apiculate; seed one, erect.

Flowering & Fruiting: March - June.

Notes: Found in dry slopes of sholas ± 900 m, common in Gethai.

PSU & NKK, Kalhatty, 27.03.1991, L a 52 (Cairn Hills); KNS, Masinagudi, 12.02.1963, 109 (FRC).

CELASTRUS L.

163. Celastrus paniculatus Willd., Sp. Pl. 1: 1125. 1797; Hook. f., Fl. Brit. India 1: 617. 1875; Gamble, Fl. Pres. Madras 208(150). 1918; Fyson, Fl. South Indian Hill St. 2: t. 63. 1932; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 73.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 87. 2000. **(PLATE 18: 153)**

Common names: Black oil plant

Climbing staff plant, Intellect plant (E); Mukarthi balli, Karigonne, Bhavanga beeja, Gangunde kayi, Gavanagorge, Kariganne, Kangili balli, Manivara (K); Cherupunna, Jyothishmathi, Killithinipanji, Paluzhavam, Valuzhavam (M); Manjakadi, Valuluvai, Vayuvidanga (T).

Distribution: South Asia and Australia. *Habitat*: Along roadsides.

Climbing shrubs; stem lenticellate. Leaves alternate, 7-12 x 4-7 cm, broadly ovate, apex abruptly acuminate, base rounded or acute, crenulate; petiole 6 mm long. Panicle to 15 x 8 cm, terminal, axillary, oblong; pedicel 6 mm long. Flowers many, 6 mm across. Sepals 5, small, imbricate, ciliate. Petals 2.5 x 2 mm, white, ovate, obtuse. Stamens 5, erect, anthers sagitate at base. Ovary 3-celled, cell 2-ovuled, stigma 3, recurved. Capsule to 1 cm across, loculicidal, yellow; seeds 3, aril reddish.

Flowering & Fruiting: December - May.

Utility: Used in Ayurveda, Folk, Siddha, Unani and Tibetian medicine. Bark is used as an abortifacient and brain tonic. Leaf sap is a good antidote for opium poisoning. Seeds are stimulant, diaphoratic, diuretic, tonic, appetizer, anti-inflammatory and used in abdominal disorders, leprosy, pruritus, skin diseases, paralysis, asthma, leucoderma, cardiac debility, inflammation, amenorrhoea, fever and for stimulating the intellect and sharpening the memory. The seed oil is used to promote intelligence, sharpening memory, beriberi and sores.

Notes: Red listed status of this species is Near threatened for Karnataka and Tamil Nadu, Vulnerable for Kerala. Found in the shola border ± 1200 m, common in Kalhatty.

PSU & NKK, Kodanad, 28.08.1994, 306 (TNFDH).

EUONYMUS L.

1. Inflorescence 1-3 flowered in solitary peduncles .... ***E. crenulatus***
1. Inflorescence 7 or more flowered in dichotomous cymes **2**

2. Twigs 4-angled .... ***E. angulatus***
2. Twigs cylindrical **3**

3. Leaves entire .... ***E. dichotomus***
3. Leaves prominently toothed .... ***E. serratifolius***

164. Euonymus angulatus Wight, Ic. t. 1053. 1846; Hook. f., Fl. Brit. India 1: 610. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 73.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 93. 2000. **(PLATE 18: 154)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Small trees or shrubs; branchlets acutely 4-angled, glabrous. Leaves opposite, oblong-lanceolate to elliptic, tapering at base, entire and thick at margin, acuminate at apex, 8-12 x 4-8 cm, coriaceous, glabrous, shining above, pale beneath; lateral nerves not conspicous. Cymes lax, usually drooping, more than 7-flowered; peduncles slender. Sepals 5, entire or fimbriate at margin. Petals 5, free, orbicular, purplish. Stamens 5, alternating with petals, inserted at margin of disc. Disc 5-lobed, fleshy. Ovary within disc; styles short, thick. Fruits 5-loculed capsules, turbinate, attenuate below, obtusely winged above.

Flowering & Fruiting: December - May.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

165. Euonymus crenulatus Wall. ex Wight & Arn., Prodr. 161. 1834; Hook. f., Fl. Brit. India 1: 608. 1875; Gamble, Fl. Pres. Madras 230(146). 1918; Fyson, Fl. South Indian Hill St. 2: t. 60. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 73.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 97. 2000. **(PLATE 18: 155)**

Common names: Cana bilichi (K); Dhanthapatri, Malamkuratha (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small trees, to 6 m high, bark grey, smooth, young branches slightly compressed. Leaves simple, opposite, decussate; stipules deciduous; petiole 2-6 mm long, slender, glabrous; lamina 3-10 x 1.5-4 cm, elliptic, ovate, elliptic-obovate or oblong-lanceolate base acute or attenuate, apex obtuse or emarginate, margin crenate-serrate towards apex, glabrous, bullate above, coriaceous; lateral nerves 4-5 pair, slender, pinnate, faint, intercostae reticulate, obscure. Flowers bisexual, reddish, 0.8-1 cm across, 3-7 (rarely 9) flowered axillary dichasial cyme; peduncles and pedicels moderately stout. Calyx deeply 5 lobed, 3 x 3 mm, ovate. Petals 5, 5 x 5 mm, free, orbicular, not fimbriate but some times crispate. Stamens 5, attached on the disc, filaments short; anthers broad; disc fleshy, 5-lobed. Ovary 5-celled, sunk in the disc, ovules 2 in each cell; style very short; stigma blunt. Fruit a capsule, 1-1.5 x 0.8-1 cm, turbinate, drooping, scarlet, 5-valved, valves obcordate; seeds solitary in each cell; aril small, orange-red.

Flowering & Fruiting: September - May.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Pykara.

PSU & NKK, Kodanad, 14.11.1994, 240 (TNFDH); KNS, Longwood, 20.04.1964, 1224 (FRC).

166. Euonymus dichotomus Heyne ex Roxb., Fl. Ind. 2: 410. 1824; Hook. f., Fl. Brit. India 1: 609. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 73.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 97. 2000. **(PLATE 18: 156)**

Common names: Malamkuratha (M); Malei-kurattha, Vini (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Small trees. Leaves 4-7 x 3-4 cm, elliptic-ovate, apex obtuse, base cuneate, upper half obscurely serrate, pale greenish below; petiole to 8 mm. Cymes dichasial, to 5 cm,

axillary. Flowers red, peduncle and pedicels slender; bracts minute, ovate. Sepals connate at base, 2 mm, orbicular. Petals 3 mm, orbicular. Stamens inserted on disc. Ovary 3-5 celled, cell 2-ovuled, style to 0.5 mm. Capsule to 1.5 cm across, obcordate, seeds 5, reddish, aril yellowish-white.

Flowering & Fruiting: March - August.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

167. Euonymus serratifolius Bedd., For. Man. Bot. 64. 1872 & Ic. t. 171. 1868-1874; Hook. f., Fl. Brit. India 1: 609. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 73.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 107. 2000.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs; branchlets slender terete, yellow. Leaves to 9 x 3.5 cm, elliptic, acuminate with sharp tip at apex, attenuate to the base, serrate, entire towards the base; nerves 4 or 5 pairs slender; petiole 7 mm long. Capsule 1.5 x 2 cm, obcordate, nearly globose, with 5 rounded lobes, deep red; seeds 10 x 6 mm, oblong, dark reddish-brown, smooth.

Flowering & Fruiting: December - May.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

MAYTENUS Molina

168. Maytenus ovata (Wall. ex Wight & Arn.) Loes. in Engl. & Prantl, Naturl. Pflanzenfam. (ed. 2) 20 b:140. 1942; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 74.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 123. 2000. *Celastrus ovata* Wall. ex Wight & Arn., Prodr. 159. 1834. *Gymnosporia ovata* (Wall. ex Wight & Arn.) Lawson in Hook. f., Fl. Brit. India 1: 619. 1875; Gamble, Fl. Pres. Madras 210(151). 1918; Fyson, Fl. South Indian Hill. St. 3:t. 306.1920. **(PLATE 18: 157)**

Common names: Elimullu (M).

Distribution: Peninsular India. *Habitat*: Open areas.

Shrubs, spines axillary, mostly confined to basal portion. Leaves to 8 x 6 cm, broadly ovate, obtuse or emarginate, base cuneate, crenate, thinly coriaceous, nerves indistinct; petiole to 1 cm. Cymes axillary, clustered, 2.5 cm; bracts 1 mm, ovate; pedicels slender,

3 mm. Sepals 1 mm, ovate. Petals 3.5 mm, obovate, spreading. Stamens 0.8 mm, inserted on disc. Ovary 1.5 mm, ovoid; 3-celled,ovules 2 in each cell; style 0.7 mm, stout; stigma 3-fid, recurved. Fruit to 1.5 cm, obovoid, dehiscent, 3-lobed at apex.

Flowering & Fruiting: December - March.

Notes: Found in the dry zones of sholas ± 1100 m, common in Kalhatty.

PSU & NKK, Kalhatty, 27.03.1991, L a 53 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 349 & 17.07.1994, 63 (TNFDH).

MICROTROPIS Wall. ex Meissn.

1. Flowers in sessile fascicles .... ***M. ramiflora***
1. Flowers in axillary peduncled cymes .... ***M. microcarpa***

Microtropis microcarpa Wight

1. Cymes lax 4-8 cm long, capsule oblong, pointed at apex .... var. ***microcarpa***
1. Cymes dense 1-1.5 cm long, capsule ellipsoid, pointed at both the ends .... var. ***densiflora***

169. Microtropis microcarpa Wight, Ic. 3: 7. T. 975. 1845; M. Lawson in Fl. Brit. India 1: 614. 1875. var. **densiflora** (Wight) Meissner & Freem. in Proc. Amer. Acad. Arts. 73: 287. 1940; K. Ramam. in N.P. Singh et al., Fl. India 5: 130. 2000. *Microtropis densiflora* Wight, Ic. 3: 7. T. 1052. 1845; M. Lawson in Fl. Brit. India 1: 614.1875; Gamble, Fl. Pres. Madras 207(149). 1918; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 74.1983. **(PLATE 18: 158)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Straggling shrubs or small trees. Leaves opposite, to 7.5 x 2.5 cm. entire, more or less elliptic, obtuse. Flowers in axillary or extra-axillary peduncled cymes; peduncles very short, stout. Sepals 5, imbricate, often unequal. Petals 5, roundish-elliptic, more or less connate at the base with the back of the disk. Stamens 5, inserted on the disk. Ovary free, ovoid or conical, imperfectly 2-3 celled; style short; stigma minutely 2-4 lobed; ovules 2 in each cell, collateral. Capsule narrowly oblong, 1-celled, 2-valved, acute at both ends; seed erect, stipitate.

Flowering & Fruiting: January - May.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Upper Bhavani.

170. Microtropis microcarpa Wight, Ic. 3:7.t. 975. 1845; var. **microcarpa**; M. Lawson in Fl. Brit. India 1: 614. 1875; K. Ramam. in N.P. Singh et al., Fl.

India 5: 131. 2000. *Microtropis ovalifolia* Wight, Ic. 3: 7.t. 976. 1845; M. Lawson in Fl. Brit. India 1: 614. 1875; Fyson, Fl. South Indian Hill St. 2: t. 62. 1932; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 74.1983. **(PLATE 18: 159)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees or shrubs. Leaves elliptic or oblong-lanceolate, 3.5-13 x 2-2.5 cm, obtuse to attenuate at base, coriaceous, glabrous above, pale beneath; petiole about 5 mm long. Inflorescence axillary or extra axillary, in dense or lax cymes 2-3 cotomous, 1.5-8 cm long; peduncles shorter than the leaves. Sepals persistent in fruit, much imbricate, lower part thick and fleshy, upper part membranous, ciliate, petaloid. Petals, obovate, clawed, veined. Stamens inserted at the base of the petals; filaments short; anthers orbicular to ovoid. Ovary ovoid-conical, ribbed; style short. Fruit ellipsoid or oblong, 1-2 cm long, pointed at both ends or at apex, rugose.

Flowering & Fruiting: September - November.

Propagation: The seeds are viable for only two days. The fruits are collected from healthy mother trees. Seeds are dried and soaked in water for removing the seed coats. Then seeds are separated and sown in well prepared mother beds which contain the rooting medium of red soil and sand. It takes 60 to 75 days for germination. The germination is of about 20 %.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 14.07.1994, 93 (TNFDH); KNS, Longwood, 20.04.1964, 1208 (FRC).

171. Microtropis ramiflora Wight, Ic. t. 977. 1845; Hook. f., Fl. Brit. India 1: 613. 1875; Gamble, Fl. Pres. Madras 207(149). 1918; Fyson, Fl. South Indian Hill St. 2: t. 61. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 75.1983; K. Ramam. in N.P. Singh et al., Fl. India 5: 131. 2000. **(PLATE 18: 160)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Evergreen trees; branchlets black purple, rough. Leaves simple, opposite, decussate, estipulate; petiole 3-10 mm long, stout, glabrous; lamina 5-13 x 2.5-6.5 cm, elliptic, elliptic-ovate or obovate, base round or subcordate, apex rounded or slightly emarginate, margin revolute, cucullate, coriaceous, glabrous, slightly rugose above. Flowers bisexual, yellowish, sessile, 6-10 in axillary condensed clusters. Sepals 5, ovate to suborbicular, unequal, margin laciniate, imbricate. Petals 5, fleshy, joined at

the base with disc; disc annular. Stamens 5, inserted on the disc; filaments subulate, basally connate. Ovary conical, seated on the disc, 2-3-celled, ovules 2 in each cell; style short, stigma 2-3 lobed. Fruit a capsule, 2 x 0.8 cm, ellipsoid, woody, apiculate, grey to rusty, 2-valved, surrounded at the base by persistent calyx; seed one, 4 x 6 mm, oblong, stipitate, erect.

Flowering & Fruiting: March - June.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

KNS, Dodabetta, 17.02.1982, 7907 (FRC).

24. CHENOPODIACEAE

1. Strongly aromatic herb, pale green leaves .... ***Dysphania***
1. Non aromatic herb, glaucous leaves .... ***Chenopodium***

CHENOPODIUM L.

172. Chenopodium album L., Sp. Pl. 219. 1753; Hook. f., Fl. Brit. India 5: 3. 1886; Gamble, Fl. Pres. Madras 1181(827). 1925; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 195.1987. **(PLATE 19: 161)**

Common names: Lamb's quarter, White goosefoot, Wild spinach, Pig weed, Bathua (E); Cherupeera, Vasthucheera (M); Paruppu-keirai, Chakkaravarthi keerai (T).

Distribution: Pantropical. *Habitat*: Wastelands.

Annual herbs. Lower and medium leaves petiolate, blade usually 2-6(-10) cm, variously trullate, rhombic-ovate to lanceolate, clearly longer than broad, base narrowly to broadly cuneate, margins irregularly serrate to entire, often somewhat 3-lobed, teeth mostly acute, often unequal in size; uppermost leaves lanceolate, usually entire. Inflorescence a variable spiciform or cymosely branched panicle, mostly terminal. Perianth segments 5, dorsally keeled, perianth falling with fruit. Pericarp thin. Seeds horizontal, black, 1.1-1.5 mm in diameter, somewhat ovate, margin weakly acute; testa with faint radial striae, otherwise almost smooth.

Flowering & Fruiting: Throughout the year.

Utility: Used in Ayurveda, Folk, Siddha and Unani medicine.

Notes: Planted vegetable by households, fallow ground etc. ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 03.02.1991, d 37 (Cairn Hills); PSU & NKK, Kodanad, 28.09.1995, 199 (TNFDH).

DYSPHANIA R. Br.

173. Dysphania ambrosioides (L.) Mosyakin & Clemants, Ukrayins'k. Bot. Zhurn. 59: 382 2002. *Chenopodium ambrosioides* L., Sp. Pl. 219. 1753; Hook. f., Fl. Brit. India 5: 4. 1886; Gamble, Fl. Pres. Madras 1181(827). 1925; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 195.1987. **(PLATE 19: 162)**

Common names: American wormseed, Goose-foot, Mexican tea, Sweet pig weed (E); Echekolli, Kattayamodagum, Mannennachedi, Nattachedi, Pookalachili (M); Kattayamodagum (T).

Distribution: Native of Tropical America; widely introduced elsewhere. *Habitat*: Cultivated lands.

Erect pungent smelling herbs, profusely branching. Leaves alternate, to 8 x 3 cm, elliptic to lanceolate, entire to deeply lobed, base attenuate, glabrous, membranous; upper leaves smaller. Flowers bisexual, minute, sessile, clustered in terminal and axillary cymes. Perianth 5-lobed, herbaceous, green. Stamens 5, free. Ovary 1-celled, with solitary ovule; styles 3; stigmas 3. Fruit a utricle enclosed by the persistent perianth.

Flowering & Fruiting: March - April.

Utility: Used in Folk and Homeopathy medicine. The parts used and uses are similar to *Chenopodium album* L. The plant is useful in ophthalmopathy, seminal weakness, splenopathy, cardiac disorders and general debility. Leaf oil used as an anthelmintic against any form of intestinal parasite including round worms, hookworms and intestinal amoebae.

Notes: Weed in cultivation ± 2050 m, common in Dodabetta.

PSU & NKK, Kodanad, 17.06.1994, 61 (TNFDH).

25. CLUSIACEAE (GUTTIFERAE)

GARCINIA L.

1. Fruit grooved to the top..***G. cowa***
1. Fruit grooved to about the middle..***G. gummi-gutta***

174. Garcinia cowa Roxb. ex DC., Prodr. 1: 561. 1824; Hook. f., Fl. Brit. India 1: 202. 1874; Gamble, Fl. Pres. Madras 74 (53). 1915; K. Ramam. in N.C. Nair

& A.N. Henry, Fl. Tamil Nadu 1: 27.1983; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 108. 1993. **(PLATE 19: 163)**

Common names: Cowa fruit, Cowa moangosteen (E); Kowa (M).

Distribution: India to Indo-China. *Habitat*: Shola forests.

Evergreen trees, to 15 m high; branches horizontal; branchlets quadrangular, drooping. Leaves simple, opposite, decussate, estipulate; petiole 8-13 mm long, stout, glabrous; lamina 8-17 x 2.5-7 cm, elliptic-oblong, oblanceolate or broadly lanceolate, base acute, attenuate or cuneate, apex acute or obtuse, margin entire, glabrous, thickly coriaceous; nerves looped along the margin forming intramarginal nerve, intercostae reticulate, obscure. Flowers dioecious, small, yellow. Male flowers: to 1 cm across, 3-8 in axillary or terminal fascicles; pedicels about 6 mm long; calyx 4, 4-6 mm long, unequal, broadly ovate, fleshy, yellow; petals 4, 8-10 mm long, oblong, yellow flushed with pink or red; stamens numerous on a convex fleshy receptacle; anthers oblong; filaments short; rudimentary pistil absent. Female flowers: upto 1.5 cm across, 2-5 in terminal fascicles, longer than male flowers, yellow; pedicel short; staminodes in a ring of 4 bundles of 3-8 around the ovary; filaments unequal; ovary superior, subglobose, 6-8 locular, ovules one in each cell; stigma sessile, flat, deeply divided into 6-8, papillose, wedge shaped rays. Fruit a berry, 2-4 cm across, depressed, globose, with 4-8 vertical grooves, smooth, yellow, ridid, beaked; seeds 4-8, oblong with a soft aril.

Flowering & Fruiting: December - September.

Utility: Used in Ayurveda medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

175. Garcinia gummi-gutta (L.) Robs., Brittonia 20: 103. 1968, var. **gummi-gutta**; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 27.1983; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3:110.1993. *Cambogia gummi-gutta* L., Gen. Pl. (ed.5) 522. 1754. *Garcinia cambogia* (Gaertn.) Desr. in Lam., Encycl. 3: 701. 1792; Hook. f., Fl. Brit. India 1: 261. 1874; Gamble, Fl. Pres. Madras 73(53). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 290.1920. *Mangostana cambogia* Gaertn., Fruct. 2: 106. 1790. **(PLATE 19: 164)**

Common names: Malabar Gamboge (E); Punarahuli, Mandahuli, Upagi mara, Simae hunase, Murugal huli, Kadagolmuruga, Panapuli (K); Korakkapuli, Kodampuli, Kudapuli, Kokakkappuli, Marapuli, Meenpuli, Perumpuli, Pinampuli, Pinar (M); Kodampuli, Kodakkapuli, Penampuli (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Evergreen trees, to 20 m high; branchlets terete, glabrous, drooping. Leaves simple, opposite, decussate, estipulate; petiole 5-20 mm long, stout, channelled above, ligulate process at the base small, glabrous; lamina 7-15 x 2-8 cm, elliptic or elliptic-oblanceolate or lanceolate, base cuneate, or attenuate, apex acute or shortly obtusely acuminate, margin entire, glabrous, coriaceous, shining. Flowers polygamo-dioecious, yellowish-white. Male flowers: 3-5 in short axillary fascicles; pedicels 7-15 mm long, thickened towards tip, often reflexed; sepals 4, fleshy with membranous margin, coriaceous, ovate or obovate, outer 2 smaller than inner. Petals 4, twice as long as the petals, concave with narrow membranous margin. Stamens 10-20 or more, inserted on a short convex receptacle, monadelphous, forming a globular head; rudimentary pistil absent or minute. Female flowers: 1-3 in terminal and axillary fascicles, larger than male flowers; pedicels 4-6 mm long. Sepals and petals as in male; staminodes 10-20, filaments unequal, connate at base in a ring around the ovary or grouped in unequal bundles. Anthers bilocular. Ovary superior, globular, 8-10 locular, ovule one in each locule; stigmatic rays 8-10, spreading, free nearly to the base, margin tuberculate. Fruit a berry, ovoid to subglobose, 4-5 cm diameter, yellow or red, 8-10 grooved, grooves ending about the middle, pericarp very thick, fleshy. Seeds 6-8, ovoid, compressed, pale brown, veined; aril succulent, white or red.

Flowering & Fruiting: January - September.

Utility: Used in Ayurveda and Folk medicine. The leaves, fruits and seed oil are antiobesity, purgative, hydragogue and emetic and are useful in ulcers, inflammations, bleeding piles, diarrhoea, dysentery, indigestion, hyperdipsia and particularly in dropsy and worm cases. Citrin is extracted from the fruits and used for antiobesity. Fruits used for fish curry and used for cold along with ginger and jack leaf petiole and Ocimum leaves.

Propagation: Initial seed moisture content is 35.84%. Spread the fruits on the floor under sun for 1-2 days to allow uniform ripening. Depulp the ripe yellow fruit to exract seeds. Dry the seeds in shade for 2 weeks after washing it with water. Initial germination is about 5%. Scrub the seeds with sand so that abrasion removes the gummy coating covering the seeds. Alternatively, either give a quick kerosene wash to the seeds followed by water wash. This pretreatment improves the seed germination to 40-43%. Sow pretreated seeds in sand bed and cover it with a thin layer of sand. Water twice a day. Germination is slow, starts after 60 days and prolongs about 3-4 months.

Notes: Common in evergreen forests and rare in sholas ± 2000 m, common in Korakundha. The Red listed status of this species is Near threatened for Karnataka, Kerala and Tamil Nadu.

PSU & NKK, Kodanad, 16.03.1991, I b 46 (Cairn Hill).

26. COMMELINACEAE

1. Flowers enclosed in spathe or bracteoles ..... ***Cyanotis***
1. Flowers not enclosed in spathe or bracteoles **2**

2. Infloresence a cyme ..... ***Commelina***
2. Inforescence a panicle or a cluster of 1-5 flowers **3**

3. Flowers regular, ovules 2-many ovuled in each locule..... ***Murdannia***
3. Flowers irregular; ovary 1-loculed in locule ..... ***Dictyospermum***

COMMELINA L.

176. Commelina wightii Raiz., Indian For. 84: 479. 1958; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 45.1989. *Commelina glabra* (Wight) Clarke in A. & C. DC., Monogr. Phan 3:163.1881, nom. illeg.; Hook. f., Fl. Brit. India 6: 371. 1892; Gamble, Fl. Pres. Madras 1539(1074). 1931. *Heterocarpus glaber* Wight, Ic. t. 2067. 1853. **(PLATE 19: 165)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Procumbent herbs, glabrous. Leaves 3-5 x 1-1.5 cm, linear-lanceolate or linear-oblong, apex acute, base obtuse, margin ciliate; sheath to 5 cm, ciliate, peduncle slender to 2-4 cm, scabrous, pubescent. Spathe 1-2 x 5-1 cm, ovate-lanceolate, acuminate, base deeply cordate. Flowers yellow, 3 mm across; sepals 3-4 x 3 mm, ovate, obtuse; petals to 10 x 5 mm; stamens 3; ovary globose, 2-ovuled. Capsule globose.

Flowering & Fruiting: July - August.

Notes: Found in the wet areas of grasslands ± 1600 m, common in Frog hill veiw.

CYANOTIS D. Don

1. Plants cobwebby or cottony **2**
1. Plants not cobwebby or cottony ..... ***C. obtusa***

2. Cymes, densely aggregated terminal to the flowering shoots; leaves linear-oblong ..... ***C. arachnoidea***
2. Cymes lax, axillary and terminal; leaves linear-lanceolate ..... ***C. villosa***

177. Cyanotis arachnoidea Clarke in A. & C. DC., Monogr. Phan. 3: 250. 1881; Hook. f., Fl. Brit. India 6: 386. 1892; Gamble, Fl. Pres. Madras 1550(1081). 1931; Fyson, Fl. South Indian Hill St. 2: t. 268. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 46.1989. **(PLATE 19: 166)**

Common names: Grass of the Dew (E).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Grasslands.

Herbs suberect, densely covered with white-cottony hairs. Leaves to 20 x 1.5 cm, upper leaves much smaller, ovate to linear-lanceolate, cottony hairy. Cymes terminal; peduncle 4 cm long; bracts 1.7 x 1 cm, ovate, acute, hairy; bracteoles curved, falcate, 10-25 pairs, 6 x 1.5 mm, densely cottony hairy. Flowers densely packed. Sepals 6 x 1.5 mm, united at the base, densely long hairy; corolla tube 7 mm long; lobes triangular, acute; filaments 12 mm long, bearded; ovary densely hairy at apex; style bearded. Capsule 2.5 mm long, oblong, hairy; seeds transversally rugose, black.

Flowering & Fruiting: August - November.

Notes: Found in the exposed slopes, rock edges, crevices of stone walls ± 2200 m, common in Mukurthi.

PSU & NKK, Wenlockdowns, 27.11.1991, L c 35 (Cairn Hills).

178. Cyanotis obtusa (Trim.) Trim., Handb. Fl. Ceylon 4: 812 1898; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 47.1989. *Cyanotis arachnoidea* var. *obtusa* Trim., J. Bot. 23: 266 1885. **(PLATE 19: 167)**

Distribution: India and Sri Lanka. *Habitat*: Grasslands.

Erect procumbent herbs. Leaves to 3 x 1 cm, lanceolate, falcate, folded, rounded at base, glabrous or villous above. Cymes terminal or axillary, solitary, to 2 cm, subcorymbose; peduncles to 5 cm long; bracts 2 x 0.5 cm, ovate, acuminate; bracteoles 2-4 pairs, 10 x 4 mm, falcate, acute. Calyx 5 x 2 mm, united at the base, hairy. Corolla tube 5 mm long, campanulate, lobes obtuse, creamy. Stamens 1.5 cm; filaments 8 mm long, bearded, violet. Style densely hairy, to 1 cm, bulged below the stigma. Capsule 4 mm long, pilose at apex; seeds 1.5 mm.

Flowering & Fruiting: July - November.

Notes: Found in moist ground or by rock edges on the plateau ± 2000 m, common in Parsons valley.

179. Cyanotis villosa (Spreng.) Schult. f., Syst. Veg. 7: 1155. 1830; Hook. f., Fl. Brit. India 6: 387. 1892; Gamble, Fl. Pres. Madras 1540(1081). 1931; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 47.1989. *Tradescantia villosa* Spreng., Syst. Veg. 2: 116. 1825. *Cyanotis lanceolata* Wight, Ic. t. 2085. 1853. **(PLATE 19: 168)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Grasslands.

Erect or procumbent herbs; stem terete, villous. Leaves 2-8 x 0.8-2 cm, ovate, sessile, cordate at base, villous above and below; sheath tubular, thickly villous. Cymes terminal and upper axillary, sessile; bracts 1.2 cm long, ovate-lanceolate, villous; bracteoles ovate, curved, ciliate along the margins. Flowers few; sepals 6-7 mm long, free, lanceolate, keel ciliate; corolla tube 6-7 mm long, lobes 4 mm long, obtuse, blue with red glands; filaments 11 mm long, bearded; style dialated below the stigma. Capsule 2-3 mm long, hairy at apex; seeds paired.

Flowering & Fruiting: November - January.

Notes: Found in moist ground or by rock edges on the plateau ± 2100 m, common in Sispara.

PSU & NKK, Kodanad, 20.10.1995, 357 (TNFDH).

DICTYOSPERMUM Wight

1. Panicle lax, much longer than the uppermost leaves; fertile stamens 3; staminodes absent .... ***D. montanum***
1. Panicle dense, shorter than the uppermost leaves; fertile stamens 2; staminodes 1 .... ***D. ovalifolium***

180. Dictyospermum montanum Wight, Ic. t. 2069. 1853. *Aneilema montanum* (Wight) Thw., Enum. Pl. Zeyl. 322. 1864; Hook. f., Fl. Brit. India 6:382.1892; Gamble, Fl. Pres. Madras 1546(1079). 1931; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 43.1989. **(PLATE 19: 169)**

Common names: Thannikkanchi (M).

Distribution: Peninsular India. *Habitat*: Shola border.

Herbs. Leaves clustered towards apex of stem, 5-13 x 2.5- 5 cm, elliptic-lanceolate, base narrowed, apex acuminate; petiole to 1.5 cm long; sheath to 3 cm long. Panicles terminal, 8-17 cm long, covered with hooked hairs; bracts leafy. Flowers white, 8-10

mm across; pedicels 4-7 mm long. Sepals 3, 3-4 x 2-3 mm, obovate, obtuse, concave. Petals 3, white, 5-6 x 3-4 mm, ovate, obtuse. Stames 3; filaments 2-3 mm long; staminodes 0. Ovary 3- celled; c. 1.5 mm long; ovule 1 in each cell; style c. 2 mm long. Capsule 2-3 mm across, globose, glabrous. Seeds hemispheric, rugose.

Flowering & Fruiting: July - October.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Mukurthi.

181. Dictyospermum ovalifolium Wight, Ic. t. 2070. 1853. *Aneilema ovalifolia* (Wight) Hook.f. ex Clarke in A. & C. DC., Monogr. Phan. 3: 218. 1881; Hook.f., Fl. Brit. India 6: 328. 1892; Gamble, Fl. Pres. Madras 1546(1079). 1934; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 43.1989. **(PLATE 20: 170)**

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Herbs; erect or decumbent at base. Leaves to 15 x 5 cm, scattered and upper ones verticillate, usually sessile, elliptic, acuminate, base acute, glabrous; sheath 2 cm long, glabrous; mouth oblique. Panicle pyramidal, congested; branches and pedicels recurved, puberulus. Flowers in a group of 3-6; sepals 3 x 2 mm, obovate, obtuse, glabrous; petals 3 x 2 mm, pale blue with red nerves; stamens 3, filaments naked. Capsule 7 x 5 mm, globose.

Flowering & Fruiting: October - December.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Ankinda.

MURDANNIA Royle

182. Murdannia lanuginosa (Wall. ex Clarke) Brueck. in Engl. & Prantl, Naturl. Pflanzenfam. 15a: 173. 1930. *Aneilema lanuginosa* Wall. ex Clarke in A. & C. DC., Monogr. Phan. 3: 214. 1881; Hook. f., Fl. Brit. India 6: 380. 1892; Gamble, Fl. Pres. Madras 1545(1079). 1931. **(PLATE 20: 171)**

Distribution: Peninsular India. *Habitat*: Grasslands.

Erect or suberect, branched herbs; fibrous roots often tuberous, slightly thickened; stem angular, glabrous or hairy. Leaves 3-6 x 0.4-0.8 cm, cauline, alternate, oblong-lanceolate or lanceolate, margin undulate, apex acute or shortly acuminate, base rounded, more or less amplexicaule, prominently striate, hairy; sheath 8-12 mm long, hairy. Flowers 5-6 mm long, 1-2, axillary to the upper leaf-sheaths; pedicels 2-4 cm long, erect or slightly bent in fruits, jointed at middle, hairy below the joints; bracteoles

2 at joints, ca. 1 mm long, membranous, ovate, obtuse. Calyx lobes 3, free, slightly unequal, ca. 6 x 2 mm, elliptic-oblong, subacute, straw-coloured, persistent. Petals 3, free, orange-yellow, bluish when dry, obovate, slightly longer than calyx lobes. Fertile stamens 3; filaments bearded; anthers 2-celled; staminodes 3. Capsule 5-7 mm long, oblong, trigonous, cuspidate with persistent style, 3-celled; seeds 3 or more, angular, pitted.

Flowering & Fruiting: November - December.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Western Catchment.

27. CONVOLVULACEAE

1. Corolla pubescent outside; fruits indehiscent .... ***Argyreia***
1. Corolla glabrous outside; fruits dehiscent .... ***Ipomoea***

ARGYREIA Lour.

1. Woody climbers; corolla pale purple .... ***A. hirsuta***
1. Simple twiny climbers; corolla pink to rose .... ***A. elliptica***

183. Argyreia elliptica (Roth) Choisy, Convolv. Orient. 35. 1834; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 102.1987. *Ipomoea elliptica* Roth, Nov. Pl. Sp. 113. 1821. *Lettsomia elliptica* (Roth) Wight, Ic. t. 1356. 1848; Hook. f., Fl. Brit. India 4: 192. 1883; Gamble, Fl. Pres. Madras 911(640). 1923. **(PLATE 20: 172)**

Common names: Nayi ugunihambu (K); Adumbuvalli (M); Thaali, Vendaankodi (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Twiners, branchlets sparsely pubescent. Leaves 5-9 x 3-5 cm, elliptic-ovate to obovate, apex acute, base rounded to truncate. Cymes lax, corymbose, to 8 cm; bracts deciduous. Calyx lobes 5, subequal, 4 x 3 mm, ovate, obtuse. Corolla pink to rose, 3-4 cm across. Stamens 5, anthers 3mm; ovary 1.5 mm, 2-loculare, cell 2-ovuled, style 1.5 cm. Berry 0.7 cm across, orange.

Flowering & Fruiting: November – March.

Notes: Found in the margin of sholas ± 1800 m, common in Thaishola.

PSU & NKK, Gethai, 10.03.1991, II c 04 (Cairn Hills).

184. Argyreia hirsuta Wight & Arn., Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 356. 1836; Hook. f., Fl. Brit. India 4: 189. 1883; Gamble, Fl. Pres. Madras 909(638). 1923; Fyson, Fl. South Indian Hill St. 2: t. 196. 1932; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 102.1987. *Rivea hirsuta* (Wight & Arn.) Wight, Ic. t. 891. 1845. *Argyreia hirsuta* Wight & Arn. var. *coacta* Clarke in Hook.f., Fl. Brit. India 4: 189. 1883. **(PLATE 20: 173)**

Common names: Onappoo, Pathvan (M).

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Climbing undershrubs; stem hirsute. Leaves 13-20 x 7-14 cm, broadly ovate, base cordate, apex abruptly acuminate, densely strigose above, tomentose beneath; nerves 7-13 pairs, prominent below; petiole 5-11 cm long, densely pubescent. Flowers in axillary few to many flowered cymes; bracts leafy, to 3 cm long, lanceolate, shortly petioled, persistent. Sepals 6-8 x 2-3 mm, oblong, obtuse, sparsely hairy, equal. Corolla 5-7 cm long, funnel-shaped, pale purple, hispid without. Style filiform; stigma 2-globose. Berry 8-12 mm across, depressed-globose, yellow. Seeds embedded in mealy pulp.

Flowering & Fruiting: November - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Manjoor, 18.01.1991, c 02 (Cairn Hills); PSU & NKK, Kodanad, 25.09.1995, 340 (TNFDH).

IPOMOEA L.

185. Ipomoea purpurea (L.) Roth, Bot. Abh. 27. 1787; Hook. f., Fl. Brit. India 4: 200. 1883; Gamble, Fl. Pres. Madras 919(645). 1923; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 108.1987. *Convolvulus purpureus* L., Sp. Pl. ed. 2, 1: 219. 1762. **(PLATE 20: 174)**

Common names: Common morning-glory (E).

Distribution: Native of Tropical America. *Habitat*: Garden escape and run wild along the roadsides.

Annual twiners; the stems slender and herbaceous; hirsute with spreading trichomes. Leaves broadly ovate to cordate, 2-10 cm long, entire or trilobate, pubescent on both

surfaces. Inflorescences of 1-5 flowered cymose clusters. Flowers on pedicels 8-15 mm long, recurved in fruit. Sepals oblong-lanceolate, 8-16 mm long, apically abruptly acute, hirsute on the basal portion. Corolla blue, purple, pink, or with stripes of these colors on a white background, the stripes occasionally broken, throat white, 3-5 cm long. Fruits capsular, depressed-globose, 10 mm long; seeds black, pyriform, glabrous.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Naturalised in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 12.02.1991, c 09 (Cairn Hills).

28. CRASSULACEAE

KALANCHOE Adanson

186. Kalanchoe grandiflora Wall. ex Wight & Arn., Prodr. 359. 1834; Hook. f., Fl. Brit. India 2: 415. 1878; Gamble, Fl. Pres. Madras 451(319). 1919; Fyson, Fl. South Indian Hill St. 2: t. 104. 1932; S. R. Srinivas. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 145.1983. **(PLATE 20: 175)**

Common names: Gandukaalinga (K).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Herbs, to 60 cm high. Leaves to 7 x 3.5 cm, obovate, obtuse, crenate, narrowed to the base, sessile. Cymes 12 cm across, panicled. Flowers closely packed; pedicels 1 cm long. Sepals 6 x 3 mm, ovate, acuminate, red-streaked. Corolla tube 12 mm long, lobes 6 x 4 mm, obovate, cuspidate; yellow. Anthers ovate. Styles 4 mm long.

Flowering & Fruiting: December - May.

Utility: Used in Folk medicine. Plants are applied to wounds and sores.

Notes: Found in the rocky cervices of shola margins ± 2100 m, common in Pykara falls.

PSU & NKK, Pykara, 26.01.1991, d 30 (Cairn Hills).

29. CUCURBITACEAE

ZEHNERIA Endl.

187. Zehneria maysorensis (Wight & Arn.) Arn. in Hook.'s, J. Bot. 3: 275. 1841, var. **maysorensis;** G. R. Kumari in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 174.1983. *Bryonia maysorensis* Wight & Arn., Prodr. 345. 1834. *Melothria mucronata* sensu Chakrav., Rec. Bot. Sur. India 17: 148. 1959, non (Blume) Cogn. 1881. *Melothria perpusilla* var. *subtruncata* Cogn. in A. & C. DC., Monogr. Phan 3: 606. 1881; Chakrav., Fasc. Fl. Ind. 11: 86. 1982. *Melothria perpusilla* sensu Gamble, Fl. Pres. Madras 538(380). 1919, non (Blume) Cogn. 1881. **(PLATE 20: 176)**

Distribution: India to South East Asia. *Habitat*: Shola border.

Herbaceous climbers; stem slender, glabrous. Leaves alternate, 7-8 x 6.5-8 cm, broadly ovate, cordate at base, acute-acuminate at apex, shallowly 3-angled, serrate along margins, minutely and densely punctuate above, glabrous to minutely papillate beneath; petiole 2-3 cm long, glabrous or sparsely hispid beneath near the lamina; tendrils simple. Plants monoecious. Flowers cream-yellow. Male flowers subumbellate; peduncle 2-4 cm long; pedicels ca 2 mm long. Calyx tube campanulate, ca 3 mm long, glabrous outside, hairy inside; lobes minute, teeth-like. Corolla lobes ovate, acute at apex, ca 2.5 mm long. Stamens 3; filaments ca 3 mm long; anthers ca 1 x 1.25 mm, papillose. Disk ca 0.5 x 0.75 mm. Female flowers solitary, axillary or co-axillary to the male peduncle; pedicels ca 2 mm long. Calyx oblong, ca 6 x 2 mm. Style ca 3.5 mm long; stigma spreading. Disk 3-lobed, ca 0.75 x 1.25 mm. Staminodes 3, filiform, ca 3 mm long, hairy. Fruits oblong, ca 1.7 x 1.1 cm, finely reticulate rugose; seeds flattened, broadly obovate, ca 3.5 x 2 mm, smooth at faces.

Flowering & Fruiting: October - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Governor Shola.

PSU & NKK, Kodanad, 14.08.1995, 297 (TNFDH); KNS, Staircase shola, 09.02.1963, 61 (FRC).

30. CYPERACEAE

1. Flower unisexual .... *Carex*
1. Flowers bisexual **2**

2. Spikes sessile .... *Schoenoplectiella*
2. Spikes staked **3**

3. Stylar base not dialated, continuous with the nut .... *Kyllinga*
3. Stylar base dialated, not continuous with the nut **4**

4. Hypogynous bristles present .... *Schoenoplectus*
4. Hypogynous bristles absent .... *Eleocharis*

CAREX L.

1. Spikelets 5-14, ovoid to subglobose, ... *C. nubigena*
1. Spikelets 5-7 in a terminal raceme, cylindrical .... *C. phacota*

188. Carex nubigena D.Don, Trans. Linn. Soc. London 14: 326. 1824; Hook. f., Fl. Brit. India 6: 702. 1893; Gamble, Fl. Pres. Madras 1165(1168). 1931; Fyson, Fl. South Indian Hill St. 2: t. 283. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 65.1989. *Carex nubigena* D.Don var. *fallax* Clarke, J. Linn. Soc. Bot. 36: 301. 1904.

Distribution: Afghanistan, India, Sri Lanka, China, Sumatra and Java. *Habitat*: Marshy areas.

Herbs; culms slender, rigid, obtusely 3-quetrous, erect, to 65 cm. Leaves shorter or longer than culms, narrowly linear, channelled or margins involute, to 0.4 cm wide; margins scabrid, sheaths brownish, fibrous. Inflorescence spicate, pyramidal to oblong, to 3 cm; rachis short. Lower bracts foliaceous, narrow-linear, overtopping, membranous, margined at base, upper ones much reduced, non-sheathing; bracteoles elongate, filiform, to 8 cm. Spikelets ovoid to subglobose, 5-14, androgynous with a few staminate flowers towards the apex, lower few distant, others crowded, sessile, to 0.5-2 x 0.4-0.8 cm. Glumes ovate, acute, cuspidate or shortly awned, translucent, greenish yellow, to 0.35 cm long; midrib 3-nerved. Style-base not thickened; stigmas 2. Nut suborbicular, biconvex, pale brown, stalked, to 0.15 cm.

Flowering & Fruiting: May - September.

Notes: Found in the marshy region of sholas ± 2100 m, common in Mukurthi.

189. Carex phacota Spreng., Syst. Veg. 3: 826. 1826; Hook. f., Fl. Brit. India 6: 708. 1894; Fyson, Fl. South Indian Hill St. 3: t. 551. 1920; Gamble, Fl. Pres. Madras 1686(1169). 1931; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 67.1989. **(PLATE 20: 177)**

Distribution: Indo-Malesia. *Habitat*: Marshy areas.

Perennials, culms 50-70 cm tall, triquetrous. Leaves cauline, 20-80 x 0.3-1 cm, linear, 3-costate; sheath keeled, open. Spikelets 5-7 in a terminal raceme, cylindrical; terminal one fully or partly male, others female, 5 cm long, 5 mm wide; pistillate glumes 2 x 1 mm, obovate, truncate at apex, aristate, blotched with red spots, hirtus. Utricle 3 x 1.5 mm, puberulus, deep brown; staminate glumes 3 x 1.5 mm, obovate, emarginate, aristate; stamens 3.

Flowering & Fruiting: November - April.

Notes: Found in the marshy region of shola border ± 2000 m, common in Porthimund.

KNS, Bangitappal, 12.05.1963, 632 (FRC).

ELEOCHARIS R. Br.

190. Eleocharis congesta D. Don, Prodr. Fl. Nepal. 41. 1825; Hook. f., Fl. Brit. India 6: 630. 1893; Gamble, Fl. Pres. Madras 1648(1145). 1931; Fyson, Fl. South Indian Hill St. 2: t. 279. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 76.1989. *Eleocharis ovata* sensu Thw., Enum. Pl. Zeyl. 351. 1864, non R. Br. 1810. *Scirpus ovatus* Thw., Enum. Pl. Zeyl. 434. 1864, non Roth 1821. **(PLATE 20: 178)**

Distribution: India, Nepal, Indo-China, China and Japan. *Habitat*: Marshy areas.

Tufted annuals; rhizome absent; culms 8-20 cm high, slender, 8-10-ridged, smooth. Sheath tubular, mouth oblique with small appendage, red glandular. Spikelets 4-6 x 3 mm, ovate, 20-40-flowered; bracts 3 x 2 mm, ovate, acute; glumes 2 x 1 mm, acute, 1-nerved, upper margin red to pink, rest hyaline; bristles 2mm long, golden yellow. Nut 1-2 mm long, obtusely 3-angled, yellow.

Flowering & Fruiting: October - January.

Notes: Found in the in the marshy region of shola border ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 24.08.1994, 613 (TNFDH).

KYLLINGA Rottb.

191. Kyllinga melanosperma Nees in Wight, Contrib. 91. 1834, ssp. **melanosperma**; Hook. f., Fl. Brit. India 6: 588. 1893; Gamble, Fl. Pres. Madras

1624(1130). 1931; Fyson, Fl. South Indian Hill St. 2: t. 278. 1932. *Cyperus melanospermus* (Nees) Sur., Cyp. Mal. Arch. 50: t. 2, 8. 1898; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 72.1989. **(PLATE 21: 179)**

Distribution: Tropical and Subtropical Asia and Africa. *Habitat*: Shola border.

Perennial herbs; culms close, 30-50 cm high. Leaves reduced to sheath, uppermost one or two normal. Inflorescence single, globose head, 0.8-1.4 x 0.6-1 cm. Spikelets 0.3-0.45 x 0.1-0.12 cm, elliptic-oblong to lance-elliptic, 1-rarely 2-flowered. Glumes mostly 4. Keel smooth or nearly so. Stamens 3. Stigma 2-fid. Nut 0.15-0.2 x 0.6-0.7 cm, ellipsoid-oblong.

Flowering & Fruiting: April - May.

Notes: Found in the marshy region of shola border ± 2050 m, common in Pykara.

PSU & NKK, Ooty, 20.03.1991, b 33 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1995, 269 (TNFDH).

SCHOENOPLECTIELLA L.

192. Schoenoplectiella articulata (L.) Lye, Lidia 6: 20. 2003. *Scirpus articulatus* L., Sp. Pl. 47. 1753; Hook. f., Fl. Brit. India 6: 655. 1893; Gamble, Fl. Pres. Madras 1666(1156). 1931; Fyson, Fl. South Indian Hill St. 2: t. 282. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 84.1989. *Isolepis articulata* (L.) Nees in Wight, Contrib. 108. 1834. *Schoenoplectus articulatus* (L.) Palla in Engl., Bot. Jahrb. Syst. 10: 299. 1889. *Scirpus subarticulatus* Roxb., Fl. Ind. 1: 217. 1820. **(PLATE 21: 180)**

Common names: Chelli (M).

Distribution: Indo-Malesia. *Habitat*: Marshy areas.

Erect tufted non rhizomatous perennial herbs, 25-35 cm tall; stem terete, transversely septate, hollow, smooth, glabrous, green. Leaves well developed in young plants, when matures leaves are not seen and base of the stem covered with 2-3 bladeless sheaths only; sheaths 2-3, upper ones 5-10 cm long, cylindrical, mouth truncate, lower sheaths reduced, 1-15 cm long. Inflorescence a pseudolateral head, seen below the middle of the stem (inflorescence appear above the water surface), 1-3 cm long and wide; bracts 1, erect, continuous with the stem, much longer than the stem. Spikelets cylindrical, 8-15 x 3-4 mm, sessile, oblong-acute; rachilla persistent, wingless; glumes spiral, ovate-acute, 4-5 x 3-4 mm, many nerved, shortly keeled, margins

hyaline; hypogynous bristles absent. Stamens 3, anthers oblong, 1 mm long. Style long; stigmas 3, shorter than the style. Nut obovate, acutely triquetrous, 1.5-1.8 x 1.2-1.3 mm, apiculate, dark brown, inconspicuously wavy ridged.

Flowering & Fruiting: August - December.

Notes: Found in the marshy region of shola border ± 2050 m, common in Pykara.

SCHOENOPLECTUS (Reich.) Palla

193. Schoenoplectus mucronatus (L.) Palla in Engl., Bot. Jahrb. Syst. 10: 299. 1889. *Scirpus mucronatus* L., Sp. Pl. 50. 1753; Hook. f., Fl. Brit. India 6: 657. 1893; Fyson, Fl. South Indian Hill St. 3: t. 549. 1920; Gamble, Fl. Pres. Madras 1666(1156). 1931; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 85.1989. **(PLATE 21: 181)**

Distribution: Eurasia, from Central and South Europe east to Japan. *Habitat*: Marshy areas.

Herbs. Culms 40-60 cm high, few together, spongy below, mouth of sheath acute. Spikelets 0.6-1 x 0.6 cm, oblong, 10-25 in a cluster 2.5 cm below the tip of the stem; glumes 4 x 3 mm, obovate, shortly mucronate, pale brown. Nut 2 x 1.7 mm, plano-convex, truncate, apiculate, dark brown; bristles equal to the nut brown.

Flowering & Fruiting: October - December.

Notes: Found in the marshy region of shola border ± 2100 m, common in Mukurthi.

PSU & NKK, Kodanad, 14.08.1995, 294 (TNFDH); KNS, Longwood, 08.05.1963, 500 (FRC).

31. DAPHNIPHYLLACEAE

DAPHNIPHYLLUM Bl.

194. Daphniphyllum neilgherrense (Wight) K. Rosenth. in Engl., Pflanzenreich. Daphniphyllac. 7. 1919; Gamble, Fl. Pres. Madras 1311(917). 1925; Fyson, Fl. South Indian Hill St. 3: t. 498. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 241.1987. *Goughia neilgherrensis* Wight, Ic. tt. 1878 & 1879. 1852. *Daphniphyllum glaucescens* Muell.-Arg. in DC., Prodr. 16: 3. 1866, non Blume 1826-1827; Hook. f., Fl. Brit. India 5: 353. 1887. *Daphniphyllum roxburghii* Baillon, Etude Euphorb. 565. 1858. **(PLATE 21: 182)**

Common names: Kozhikkulamavu, Peekkiri, Vellakottlan (M).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Trees, to 15 m, bark surface greyish-brown, smooth; blaze yellow; exudation milky; branchlets stout. Leaves simple, alternate, clustered at the tip of branchlets, estipulate; petiole 5-25 mm, slender, glabrous; lamina 3.5-12 x 1.5-5 cm, obovate, elliptic-obovate or obovate-oblong, base acute, apex acute or obtuse, margin entire, revolute, glabrous above and glaucous beneath, coriaceous; lateral nerves 5-10 pairs, slender, intercostae reticulate, faint. Flowers unisexual, yellowish-green, in axillary racemes. Male flowers: bracts 3 x 3 mm, ovate, obtuse, ciliate; tepals 5, minute; stamens 5-12, free; anthers oblong; connective apiculate. Female flowers: bracteate, perianth similar to male flowers; ovary superior, imperfectly 2-celled; ovules 2 in each cell; stigmas thick, recurved, undivided. Fruit a drupe, 10-12 mm long, ovoid, greenish-red.

Flowering & Fruiting: January - June.

Propagation: The matured fleshy fruits are immersed in water overnight, depulped and sown in the mother bed. Germination of about 20% is noticed from 45 to 60 days. Seed viability is very poor but good if sown immediately after collection. Minimum of 90 days are taken to reach optimum 2-3 pair of leaves stage for transplanting. To attain plantable size of 60-75 cm, it takes nearly 12 months.

Notes: An evergreen tree found in sholas; well suited for shola planting. Ecologically valuable trees, wood is also used as fuel. Found in the ecotone region of sholas ± 2100 m, common in Pykara.

PSU & NKK, Wedlockdowns, 27.01.1991, a 10 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 293 & 20.10.1994, 201(TNFDH); KNS, Kodanad, 07.05.1963, 401 (FRC).

32. DROSERACEAE

DROSERA L.

1. All leaves at the base, rosette .... ***D. burmannii***
1. Leaves cauline, peltate .... ***D. peltata***

195. Drosera burmannii Vahl, Symb. Bot. 3: 50. 1794; Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452(320). 1919; Fyson, Fl. South Indian Hill St. 2: t. 105. 1932; S. R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 146.1983. **(PLATE 21: 183)**

Common names: Hula hidaka gida, Manjumani gida (K); Aluzhanni, Poochi-unndun-chedi (T).

Distribution: Pantropical. *Habitat*: Marshy areas.

Acaulescent herbs. Leaves to 10 x 8 mm, obovate, obtuse, prostrate, densely covered with glandular hairs, greenish pink; petiole absent. Flowers few in erect racemes; scape 6-8 cm high; calyx glandular; petals 3 mm across, white; stamens 5; ovary ovoid; style apically lobed. Capsule 6 x 4 mm, obovoid; seeds black.

Flowering & Fruiting: August - December.

Utility: Used in Folk medicine.

Notes: Found in the marshy region of shola border ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, b 31 (Cairn Hills); PSU & NKK, Kodanad, 08.08.1994, 111 (TNFDH); KNS, Kodanad, 07.05.1963, 421(FRC).

196. Drosera peltata Smith in Willd., Sp. Pl. 1: 1546.1797; Hook. f., Fl. Brit. India 2:424.1878; Gamble, Fl. Pres. Madras 452(320). 1919; Fyson, Fl. South Indian Hill St. 2: t. 100. 1932; S. R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 146.1983. **(PLATE 21: 184)**

Common names: Shield Sundew (E); Krimi nashini (K); Azhukanni, Kosuvettipullu (M); Poochi-unndun-chedi (T).

Distribution: Indo-Malesia to Australia and East Asia. *Habitat*: *Acacia* plantations.

Herbs with subterranean globose tuber, solid, smooth, about 0.5 cm in diameter; stems erect, 15.3 cm high, occasionally with a branch or two near the top, glabrous. Leaves alternate, many, along the whole length of the stem, with a very slender curved subcapillary petiole 1.0-2.5 cm long; leaf blade peltately attached, semicircular, with the upper edge straight or slightly concave and prolonged at the corners into acuminate horns, thus giving the blade a semilunate outline, carrying on its adaxial surface numerous long, viscid stipitate glands. Inflorescens terminal or lateral, 1-5 cm long, usually 2-8 flowered; flowers 1.5 cm across; pedicels 0.8-1.5 cm long. Calyx segments ovate, glabrous but laciniate or ciliate at the margins. Petals white, spathulate-obovate. Ovary globose; styles 3, fimbriate towards the apex. Capsule 7 x 4 mm, ovoid; seeds oblong, black.

Flowering & Fruiting: December - March.

Utility: Used in Folk medicine. The plant is used in Siddha and Folk medicines. Leaves used as a blistering agent, plant is used as antisyphillitic and tonic.

Notes: The Red listed status of this non-endemic species is Endangered for Karnataka and Tamil Nadu, Vulnerable in Kerala. Found in the moist regions of sholas ± 2100 m, common in Pykara.

PSU & NKK, Anumapuram, 29.01.1991, I b 32 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 19 (TNFDH); KNS, Kokuthorai, 12.05.1963, 748 (FRC).

33. ELAEAGNACEAE

ELAEAGNUS L.

197. Elaeagnus kologa Schult. in DC., Prodr. 14: 611. 1857; Gamble, Fl. Pres. Madras 1246(873). 1925; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 214.1987. *Elaeagnus latifolia* L., Sp. Pl. 121. 1753, p.p; Hook. f., Fl. Brit. India 5: 202. 1886; Fyson, Fl. South Indian Hill St. 2: t. 231. 1932. **(PLATE 21: 185)**

Common names: Gunnamada patte balli (K); Kayalampuvalli, Kattumunthiringa, Povilam, Poolanpazham (M); Kattumangavalli, Kolangai, Kurangu pazham, Vellelai (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Large woody stragglers; young stem, leaves below and inflorescence densely lepidote with silvery and coppery scales mixed. Leaves alternate, 4-8 x 2.5-4 cm, elliptic oblong, acute to slightly acuminate at apex, attenuate at base, densely scaly below, sparsely so above when young. Racemes short, axillary, 5-7-flowered. Flowers 0.6-0.7 cm across. Perianth campanulate; tube 0.8-1 cm long; lobes 4, 0.2-0.3 cm long, triangular. Stamens 4, included. Ovary 0.2-0.3 cm long, 1-celled; ovule 1; style rolled and included, silvery hairy; stigma lateral. Drupe 1-1.5 x 0.8-1 cm, oblong, orange-red on opening.

Flowering & Fruiting: January - May.

Utility: Used in Folk and Siddha medicine.

Propagation: The fleshy fruits are soaked in water and pulp portion removed so as to get the seeds separated. The dried seeds are soaked in water and sown in mother beds. Germination is noticed in 25 days and 30% germination is obtained. As there is heavy damage due to grass hoppers and other insects, broadcasting neem cake powder is essential. Seeds are viable for two weeks. The four leaves stage is optimum

for pricking out. Roots of seedlings are dipped in bio-fertilizer mixture of *Azospirillum* and *Phosphobacterium* solution for 20 minutes.

Notes: Climbing on shola trees ± 2050 m, common in Pykara. Fruits are edible.

KNS, Staircase shola, 25.02.1977, 6697 (FRC).

34. ELAEOCARPACEAE

ELAEOCARPUS L.

1. Leaves inverted as a boat shaped .... ***E. recurvatus***
1. Leaves not recurved **2**

2. Anthers glabrous, neither aristate nor with tuft of terminal bristiles .... ***E. variabilis***
2. Anthers aristate or with terminal tuft of bristles **3**

3. Anthers aristate; leaves rounded or truncate at base .... ***E. munronii***
3. Anthers with terminal tuft of bristles; leaves cuneate at base .... ***E. serratus***

198. Elaeocarpus munronii (Wight) Mast. in Hook. f., Fl. Brit. India 1: 407. 1874; Gamble, Fl. Pres. Madras 124(88). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 293.1920; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 46.1983; S.K. Murti in B.D. Sharma & Sanjappa, Fl. India 3: 546. 1993. *Monocera munroii* Wight, Illustr. 1: 83. 1840 & Ic. t. 952. 1845. **(PLATE 21: 186)**

Common names: Edinichi, Kalbikki, Naribikki (K); Kalrudraksham, Pungari, Shirukodala (M); Narebikki (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 20 m high, bark dark grey, smooth; branchlets sympodial, slender. Leaves simple, alternate, clustered to the tip of branchlets; stipules free, lateral, cauducous; petiole 25-50 mm, very slender, glabrous, slightly swollen at tip and base; lamina 4-10 x 1.7-5 cm, ovate or ovate-lanceolate, base round or obtuse, apex acuminate or caudate-acuminate, margin crenate or serrate, revolute, glabrous, chartaceous, nerve axils glandular beneath; lateral nerves 3-6 pairs, pinnate, prominent, intercostae reticulate, slender, prominent. Flowers bisexual, white, in short drooping axillary racemes. Sepals 5, 8 mm long, lanceolate, thinly tomentose. Petals 5, white with reddish lines at base, ovate-lanceolate, laciniate, densely silky on both sides, inserted round the base of glandular disc. Stamens numerous, inserted between the glands on the disc; anthers awned with long bristle. Ovary densely superior, silky hairy, placed

on the torus, 2-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, blue, oblong, terete, glabrous, glaucous; stone 1-2 seeded.

Flowering & Fruiting: September - April.

Propagation: Hard coated seeds are soaked in cow dung solution for 24 hours and sown 10 cm. apart in well prepared mother bed. Germination of 60% is noticed between 20-30 days and continues upto three months. Seeds are viable for six months. After 60 days, healthy and even height seedlings are to be picked out. Being a slow growing species, heavy dose of DAP and neem cake powder application are necessary to obtain 1 metre tall seedlings in 12 months period.

Notes: Fruits are edible. This tree is considered as a holy tree in Nilgiris. Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Outcherloney, 02.02.1991, b 55 (Cairn Hills); KNS, Coonoor, 19.03.1969, 3680 (FRC).

199. Elaeocarpus recurvatus Corner, Gard. Bull. Straits Settlm. 10: 319,325. 1939; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 46.1983; S.K. Murti in B.D. Sharma & Sanjappa, Fl. India 3: 549. 1993. *Elaeocarpus ferrugineus* (Wight) Bedd., Fl. Sylv. t. 112. 1871, nom. illeg.; Hook. f., Fl. Brit. India 1: 406. 1874; Gamble, Fl. Pres. Madras 124(88). 1915; Fyson, Fl. South Indian Hill St. 2: t. 38. 1932. *Monocera ferruginea* Wight, Ic. t. 205. 1839, non jack. 1830. **(PLATE 21: 187)**

Common names: Solabikki (K); Cholarudralksham, Rudraksham (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees. Leaves simple, alternate, clustered at the tip of branchlets, stipules free, lateral, cauducous; petiole 15-50 mm, stout, tomentose; lamina 7.5-15 x 4-8 cm, ovate or ovate-oblong, folded back, boat shaped, base acute or cuneate, apex acute or caudate, margin crenate or serrulate, glabrous above except downy midrib, softly pubescent beneath, coriaceous, lateral nerves 6-10 pairs, pinnate, prominent, veins dividing dichotomously towards the margin, intercostae reticulate, obscure. Flowers bisexual, white, in short axillary racemes to 7 cm. Sepals 5, lanceolate, pubescent. Petals 5, 1.2 cm long, broadly ovate, sparsely within, inserted round the base of glandular disc. Stamens numerous, inserted between the glands on the disc; anthers ending in straight bristle. Ovary superior, subglobose, densely silky outside, 3-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, ovoid; stone single, compressed, coarsely tubercled; seed one.

Flowering & Fruiting: February - May.

Propagation: As the endosperm dries up in undeveloped fruits, green coloured matured fruits are selected, dried, soaked in cowdung solution for 2 days before sowing. About 90% germination is noticed from 45 days. Fruits are viable for three months. The seedlings become ready for transplantation in the polythene containers when they reach four pairs of leaf stage. The straight rooted seedlings are given a dipping in bio-nutrient solution and pricked out. As leaf shedding occurs very often, foliar application of DAP is also recommended to obtain healthy seedlings.

Notes: A tree ideally suited for planting in and around gardens. Fruits are eaten by animals. Timber used for building purpose. Found in the ecotone region of sholas ± 2100 m, common in Dodabetta.

PSU & NKK, Nanjanad, 13.02.1991, b 54 (Cairn Hills); KNS, Kundah, 12.05.1963, 617 (FRC).

200. Elaeocarpus serratus L., Sp. Pl. 515. 1753, var. **serratus**; Hook. f., Fl. Brit. India 1:401.1874; Gamble, Fl. Pres. Madras 124(88). 1915; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 46.1983; S.K. Murti in B.D. Sharma & Sanjappa, Fl. India 3: 553. 1993. *Elaeocarpus oblongus* Gaertn., Fruct. 1: 202. t. 43. 1788. **(PLATE 22: 188)**

Common names: Wild Olive tree, Ceylon Olive (E); Beagada mara, Nayaneeraluka, Kumae, Nanchuna mara, Beejada mara (K); Bhadraksham, Kara, Karamavu, Nallakara, Perinkara, Valiyakara (M); Saelamaram, Olankarai, Karamaram, Ulangkarai, Uttraccham (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Trees, to 20 m high, aerial roots on large buttresseses; branchlets, petioles, peduncles and young leaves densely pubescent. Leaves simple, alternate; petiole 15-40 mm, slender, pubescent, swollen tipped, with 2 minute glands at tip; lamina 5-14 x 2-6.2 cm, elliptic-obovate or elliptic ovate, base acute or cuneate, apex acute, caudate-acuminate or obtusely acuminate, margin crenate-serrate, glabrous, coriaceous. Flowers bisexual, white, in axillary racemes to 8 cm long. Sepals 5, ovate, pubescent on outside, densely glandulose, valvate. Petals 5, laciniate, inserted round the base of glandular disc. Stamens many, inserted between the glands on the disc; anthers not awned, tipped with hairs. Ovary superior, densely tomentose, raised on torus, 3-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, subglobose, green, style persistent; stone tubercled; seed one.

Flowering & Fruiting: April - September.

Utility: Used in Ayurveda, Folk, Siddha and Unani systems of medicine. A substitute of 'Rudraksah' *Elaeocarpus sphaericus* (Gaertn.) K. Schum.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

201. Elaeocarpus variabilis Zmarzty, Kew Bull. 56: 429. 2001. *Elaeocarpus oblongus* sensu Mast. in Hook.f., Fl. Brit. India 1: 403. 1874, non Gaertn. 1788; Gamble, Fl. Pres. Madras 124 (88). 1915; Fyson, Fl. South Indian Hill St. 2: t. 37. 1932. *Craspedum tectorium* Lour., Fl. Cochinch. 336. 1790. *Elaeocarpus tectorius* (Lour.) Poir. in Lam., Encycl. Suppl. 2: 704. 1812; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 46.1983; S.K. Murti in B.D. Sharma & Sanjappa, Fl. India 3: 559. 1993. *Elaeocarpus glandulosus* sensu auct. Manilal, Fl. Silent Valley 36. 1988. **(PLATE 22: 189, 189a & 189b)**

Common names: Kara, Kattakara, Kotlampazhamaram, Malamkara, Varali (M); Bikki, Kattukarai (T).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Trees, bole buttressed; bark greyish-brown; blaze red; branchlets, young leaves and buds densely pubescent. Leaves simple, alternate; stipules lateral, caudous; petiole 15-35 mm, slender, pubescent when young, swollen at base and tip, 2 minute glands at tip; lamina 5-12 x 2.3-6.5 cm elliptic-ovate, elliptic-obovate, elliptic-oblong or ovate, base cuneate or acute, apex abruptly acuminate with emarginate tip, margin distantly crenate or serrate, glabrous on both sides, coriaceous, punctate, domatia glandular, lateral nerves 4-8 pairs, pinnate, slender, prominent, intercostae reticulate, slender, faint. Flowers bisexual, white, in axillary and terminal racemes; peduncle puberulus when young; pedicel 3 mm long. Sepals 5, 4-5 mm, ovate-lanceolate, puberulous outside, glandular inside. Petals 5, white, 6-8 mm, laciniate, glandular, inserted round the base of glandular disc. Stamens many, inserted between the glands on the disk; anthers tipped with hairs. Ovary superior, subglobose, placed on a raised torus, densely hairy outside, 3-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, 2.5 × 2.5 cm, oblong, stone one.

Flowering & Fruiting: May - October.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Pykara. Fruits edible.

PSU & NKK, Kodanad, 27.02.1991, b 56 (Cairn Hills); KNS, Aramboly House, 25.02.1977, 6697 (FRC).

35. ERICACEAE

1. Shrubs, leaves gland dotted, flowers white, capsule succulent .... *Gaultheria*
1. Trees, leaves grey-tomentose beneath, flowers red, capsule woody...................... *Rhododendron*

GAULTHERIA Kalm ex L.

202. Gaultheria fragrantissima Wall., Asiat. Res. 13: 397. 1820; Hook. f., Fl. Brit. India 3: 457. 1882; Gamble, Fl. Pres. Madras 743(522). 1921; Fyson, Fl. South Indian Hill St. 3: t. 408. 1920; R. Rajan in Henry et al., Fl. Tamil Nadu 2: 58.1987. *Gaultheria leschenaultii* DC., Prodr. 7: 593. 1839. **(PLATE 22: 190)**

Common names: Indian Winter green (E); Moolai (K); Kolakkattachedi, Kolgate-chedi (M); Kolakkai (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Compact Shrubs; branchlets tetrete. Leaves alternate, elliptic, to 9 x 5.5 cm, thick-coriaceous, gland-dotted, base acute to obtuse, margin serrulate, apex acute or obtuse; glands reddish; petiole 1 cm. Racemes in upper axils, to 7 cm, numerous flowered. Flowers erect, actinomorphic; bracts 2, ovate, margins serrate; bracteoles smaller. Calyx 5-lobed; lobes triangular, margins puberulose. Corolla urceolate, 6 mm wide, white, often tinged pinkish; tube 5 mm; lobes 5, rounded reflexed. Stamens 8 or 10; filaments dorsally spurred, opening by apical slits. Ovary superior, 5 celled; ovules numerous, on axile placentae. Capsule cupular, blue with red stalk, 4.5 x 3.5 mm, loculicidally 5-valved, enveloped by the accrescent, fleshy calyx; seeds numerous, pyramidal.

Flowering & Fruiting: April - May.

Utility: Used in Ayurveda and Folk medicine. Commonly used for Iodex preparation, oil extracted from leaves is used for body pain, head-ache etc. Fruits edible.

Notes: Found in wayside thicklets, shola border, slopes etc. ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 27.02.1991, II b 26 (Cairn Hills); PSU & NKK, Kodanad, 10.10.1994, 199 & 28.09.1995, 607 (TNFDH);KNS, Kothagiri, 08.05.1963, 457 (FRC).

203. Rhododendron arboreum J. E. Smith ssp. **nilagiricum** (Zenk.) Tagg. in Stevenson, Sp. Rhod. 15. 1930; R. Rajan in Henry et al., Fl. Tamil Nadu 2: 58.1987. *Rhododendron arboreum* J. E. Smith; Fyson, Fl. South Indian Hill St. 2: t. 179. 1932; var. *nilagirica* (Zenk.) Clarke in Hook. f., Fl. Brit. India 3: 466. 1881. *Rhododendron nilagiricum* Zenk., Amer. Sci. Nat. ser. 2. 6: 150. 1836; Gamble, Fl. Pres. Madras 743(523). 1921. **(PLATE 22: 191)**

Common names: Billy (K); Alanchi, Kattupoovarasu (M); Alingi, Billimaram, Poomaram, Vellimarom (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, bark brown, rough, vertically shallowly fissured, flaking off in scales; branchlets stout. Leaves simple, alternate, clustered towards the tip of branchlets, estipulate; petiole 10-20 mm long, stout, tomentose; lamina 3.7-12.7 x 2.5-5 cm, oblong-ovate, oblong-lanceolate or elliptic-oblong, base obtuse or round, apex obtuse, apiculate, margin entire, glabrous above, tomentose beneath; lateral nerves 8-14 pairs, pinnate, prominent, intercostae reticulate, faint. Flowers bisexual, dark crimson or pink, in terminal capitate racemes, rarely solitary or axillary; bracts broad, silky, cauducous; bracteoles linear. Calyx lobes 5. Corolla urceolate; lobes 5. Stamens 10, free; filaments slender; anthers oblong. Ovary superior, 5-celled, ovules many; style slender; stigma capitate. Fruit a capsule, oblong, woody; valves at length reflexed; seeds many.

Flowering & Fruiting: February - June.

Utility: Used in Ayurveda, Folk, Siddha, Unani and Tibetian medicine.

Propagation: Matured pods are collected in time, dried and before it breaks, brought to a closed room. The minute seeds are sown in boxes and pots filled with fine sand or powdered brick in wet condition. The seeds should not be covered. The boxes or pots are sheltered from rain and sun and watered regularly. Very poor viability should be sown immediately after the collection. Germination is noticed from 30 to 40 days. Germination is of about 30 %.

Notes: Found in the shola border, slopes; early colonizer on cleared slopes ± 2050 m, common in Pykara.

PSU & NKK, Glenmorgan, 26.01.1991, b 27 (Cairn Hills); PSU & NKK, Kodanad, 22.03.1994, 21 & 25.11.1994, 397 (TNFDH); KNS, Staircase shola, 09.02.1963, 62 (FRC).

36. ERIOCAULACEAE

ERIOCAULON L.

1.	Leaves thick, large, smooth, heads thick	***E. robustum***
1.	Leaves flat, small, heads weak	**2**
2.	Stem with hairs; peduncle solitary or few to 75 cm high	***E. brownianum***
2.	Stem without hairs; peduncles many, 35-45 cm long	***E. odoratum***

204. Eriocaulon brownianum Mart. ex Wall., Pl. Asiat. Rar. 3: 25. t. 248. 1832; Hook. f., Fl. Brit. India 6: 576. 1893; R. Ansari & N.P. Balakr., Eriocaul. India (Rev.) 20. 2009. *Eriocaulon brownianum* Mart. ex Wall. var. *nilgiriensis* (Steud.) Fyson, J. Indian Bot. Soc. 2: 262. 1921 & Fl. South Indian Hill St. 2: t.565. 1932; Gamble, Fl. Pres. Madras 1619(1127). 1931. *Eriocaulon nilagiriensis* Steud., Syn. Pl. Glum. 2: 271. 1855; Fyson, Fl. South Indian Hill St. 2: t. 273. 1932; M. Chandrabose in A.N. Henry et al., Fl. Tamil Nadu 3: 64.1989. **(PLATE 22: 192)**

Common names: Buttonpoovu (M).

Distribution: India, Myanmar and Sri Lanka. *Habitat*: Marshy areas.

Perennial herbs; rhizome stout, to 10 cm high, densely covered with leaf-sheaths. Leaves few to many, to 60 x 2 cm, linear-lanceolate, flat or folded, pubescent towards the base, widely sheathing. Peduncle solitary or few, to 75 cm high. Heads depressed globose, 1-2 cm across; involucral bracts black, obovate, brown wooly at base; floral bracts spathulate, cuneate, acute, white, papillose hairy. Female sepals free, boat-shaped, hairy; petals oblong, white pilose, black glandular.

Flowering & Fruiting: April - June.

Notes: Found in the marshy region of grasslands ± 2000 m, common in Pykara water falls.

PSU & NKK, Kodanad, 17.08.1994, 125 (TNFDH); KNS, Kodanad, 07.05.1963, 434 (FRC).

205. Eriocaulon odoratum Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 280. 1851; Hook. f., Fl. Brit. India 6: 574. 1893; Gamble, Fl. Pres. Madras 1618(1127). 1931; M. Chandrabose in A.N. Henry et al., Fl. Tamil Nadu 3: 64.1989; R. Ansari & N.P. Balakr., Eriocaul. India (Rev.) 38. 2009. *Eriocaulon collinum* Hook. f., Fl. Brit. India 6: 584. 1893; Gamble, Fl. Pres. Madras 1620(1128).

1931; Fyson, Fl. South Indian Hill St. 2: t. 274. 1932. *Eriocaulon christopheri* Fyson, Bull. Misc. Inform. Kew 1914: 330. 1914 & J. Indian Bot. Soc. 2: 206. 1921. *Eriocaulon oliveri* Fyson, Bull. Misc. Inform. Kew 1914:331.1914 & J. Indian Bot. Soc. 2:206.1921. **(PLATE 22: 193)**

Common names: Buttonpoovu (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Marshy areas.

Herbs. Leaves to 10 x 0.3 cm, lanceolate, acute at apex, glabrous. Peduncles many, 35-45 cm long, glabrous; sheath to 6 cm long, limb minute. Heads depressed globose; involucral bracts 3 x 2 mm, obovate, obtuse, hyaline; floral bracts 4 x 1.5 mm, deltoid, acuminate to a sharp point, sparsely or densely hairy. Female sepals 2 x 1 mm, ovate, concave, hairy along the keel; petals oblanceolate, hairy, white; seed oblong, appendages many, on transverse walls. Male sepals united into a 3-lobed sheath, black, hairy; petals 3, unequal, white, one larger anther black.

Flowering & Fruiting: November - January.

Notes: Found in the marshy region of grasslands ± 2050 m, common in Pykara water falls.

PSU & NKK, Pykara, 26.01.1991, b 20 (Cairn Hills); KNS, Bangitappal, 12.05.1963, 640 (FRC).

206. Eriocaulon robustum Steud., Syn. Pl. Glum. 2: 271. 1855; Hook. f., Fl. Brit. India 6: 572. 1893; Gamble, Fl. Pres. Madras 1618(1126). 1931; Fyson, Fl. South Indian Hill St. 2: t. 272. 1932; M. Chandrabose in A.N. Henry et al., Fl. Tamil Nadu 3: 64.1989; R. Ansari & N.P. Balakr., Eriocaul. India (Rev.) 122. 2009. **(PLATE 22: 194)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Marshy areas.

Tufted herbs. Leaves usually 7.5-15 cm long and narrowed gradually from a clasping base, 2-2.5 cm broad, to the obtuse end, lanceolate or oblanceolate, quite glabrous, finely striate. Flower stems solitary, 20-60 cm high, finely ribbed and twisted; sheath rather longer than the leaves, expanded 1 cm below the mouth. Heads 1-2 cm broad, usually broadest near the top, covered when the flowers are out with the long white, downward directed petals of the male flowers, except often in a band above the base, so that the head appears narrowest here. Involucral bracts many-seriate, ovate, acute, glabrous or with a very few short hairs, scairous, olive-black in colour; floral bracts obovate-lanceolate-deltoid, fringed at the top with white hairs. Receptacle villous,

more or less hollowed at the top. Male flowers: petals oblanceolate, hairy, one much longer than the other two and the bract, and more hairy, all three with a black gland. Anthers black. Female flowers: sepals three; petals oblanceolate, all equal in length. Ovary of three cells, yellow: styles long, connected only near the base.

Flowering & Fruiting: June - April.

Notes: Found in the marshy region of grasslands ± 2050 m, common in Pykara water falls.

37. EUPHORBIACEAE

1. Flowers without perianth, arranged in cyathia; stamens 2 or more .... ***Euphorbia***
1. Flowers with perianth, not in cyathia; stamens 2 or more **2**

2. Locules of ovary 2-ovuled **3**
2. Locules of ovary 1-ovuled **7**

3. Petals present .... ***Briedelia***
3. Petals absent **4**

4. Disc absent, anthers connate into a tube .... ***Glochidion***
4. Disc present, anthers not connate into a tube **5**

5. Plants monoecious .... ***Phyllanthus***
5. Plants dioecious **6**

6. Styles confluent in a long or short column or cone .... ***Antidesma***
6. Styles separate or if partly connate, style-arms and stigmatic lobes free .... ***Breynia***

7. Pistillode absent .... ***Croton***
7. Pistillode conspicuous **8**

8. Plant herbs .... ***Acalypha***
8. Plant trees **9**

9. Anthers 2-loculed .... ***Mallotus***
9. Anthers 4-loculed .... ***Macaranga***

ACALYPHA L.

207. Acalypha brachystachya Hornem., Cat. Hort. Hafn. Willd. Enum. Hort. Berol 992. 1809; Hook. f., Fl. Brit. India 5: 416. 1887; Gamble, Fl. Pres. Madras 1330(930). 1925; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 220.1987. **(PLATE 23: 195)**

Distribution: Indo-Malesia and West Asia. *Habitat*: Shola border.

Prostrate or procumbent herbs; stems striate, puberulus. Leaves ovate, acute, rounded to cordate at base, 3-5-nerved from base, sparsely hairy; petiole 0.5-2 cm long. Racemes to 1.5 cm long, bisexual, axillary. Female flowers 1-4 at the base of the raceme, sessile, sepals 3-5, oblong, glandular-ciliate; styles 3, bifid above. Male flowers many, towards the upper part of raceme; perianth lobes glandular pubescent; stamens 8, free, on a dome-shaped receptacle. Capsule 2 x 2 mm, hispid; seeds ovoid with hilum at one end.

Flowering & Fruiting: September - December.

Notes: Found in the shola border ± 2100 m, common in Ankinda.

ANTIDESMA L.

208. Antidesma montanum Blume, Bijdr. 1124. 1826; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 24: 26. 2000; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 305. 2007. *Antidesma pubescens* Roxb. var. *menasu* Tul., Ann. Sci. Nat. Bot. ser. 3, 15: 215. 1851. *Antidesma acuminatum* Wight, Ic. t. 1991. 1853; Hook. f., Fl. Brit. India 5: 363. 1887. *Antidesma moritzii* (Tul.) Muell.-Arg., Linnaea 34: 67. 1865 & in DC., Prodr. 15: 252. 1866; Hook. f., Fl. Brit. India 5: 362. 1887. *Antidesma refractum* Muell.-Arg. in DC., Prodr. 15: 257. 1866. *Antidesma smile* Muell.-Arg. in DC., Prodr. 15: 259. 1866. *Antidesma menasu* (Tul.) Miq. ex Muell.-Arg. in DC., Prodr. 15:257. 1866p.p., Hook. f., Fl. Brit. India 5: 364. 1887p.p,; Gamble, Fl. Pres. Madras 1297(908). 1925; Fyson, Fl. South Indian Hill St. 3: t. 499. 1920. *Antidesma menasu* (Tul.) Miq. ex Muell.-Arg. var. *linearifolia* Hook.f., Fl. Brit. India 5: 364. 1887. *Antidesma montanum* Blume var. *microcarpum* Airy Shaw, Kew Bull. 36: 263. 1981. **(PLATE 23: 196)**

Common names: Putharaval, Thathalamaram (M).

Distribution: Indo-Malesia and East Himalayas. *Habitat*: Shola forests.

Small trees, to 6 m tall, branchlets grey pubescent; bark browinish, scaly. Leaves ca. 9-20 x 4-10 cm, oblong-lanceolate, long acuminate at apex, subcoriaceous, glabrous and shining on both sides, base rounded or narrowed, veins prominent beneath, stipules narrow, caduceus. Flowers pale green, in axillary and terminal, solitary or paniculate racemes. Male flowers pedicellaed; calyx 3-4 lobed; stamens 3-4. In female flowers ovary glabrous; stigma short. Drupes fleshy, ovoid, acute, 2-2.5 mm long, reddish when matured.

Flowering & Fruiting: January - December.

Utility: Used in Folk and Siddha medicine. Leaves are considered as an antidote to the sting of cobra. Fruits are edible.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

BREYNIA J.R. & G. Forst.

209. Breynia retusa (Dennst.) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 204. 1929; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 220.1987; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 20: 505. 1996. *Phyllanthus retusus* Dennst., Schluss. Hort. Malab. 24. 1818. *Breynia patens* (Roxb.) Rolfe, J. Bot. 11: 359. 1882; Hook. f., Fl. Brit. India 5: 329. 1887; Gamble, Fl. Pres. Madras 1304(912). 1925; Fyson, Fl. South Indian Hill St. 3: t. 497. 1920. *Phyllanthus patens* Roxb., Fl. Ind. 3: 667. 1832. *Melanthesa turbinata* Wight, Ic. t. 1897. 1852. **(PLATE 23: 197)**

Common names: Bilisuli, Hulakaddi, Kadubikkane (K); Aattacherukola, Ekdania (M).

Distribution: Sri Lanka to Indo-China. *Habitat*: Shola border.

Shrubs, 1-1.5 m high. Leaves 1.3-2.5 x 0.7-1.3 cm, broadly elliptic or ovate, base rounded or acute, apex obtuse, glaucous below, black on drying; petiole to 2 mm long. Flowers unisexual, solitary, axillary. Male flowers ca 3 mm across; pedicels c. 1 mm long; perianth turbinate, 3-4 mm long, truncate; lobes 5-6; stamens 3. Female flowers 5-6 mm across; pedicels 3-4 mm; perianth campanulate, 3-4 mm long, 5-6-lobed. Ovary globose; stigma bifid. Capsule 1.2-1.5 cm across, depressed globose, orange-red on ripening. Fruiting perianth enlarged.

Flowering & Fruiting: February - December.

Utility: Used in Ayurveda, Folk and Unani medicine. Bark is used in diseases of nervous system, oedema, disorders of blood and conjuctivitis. Leaves are employed as poultice to hasten suppuration and as a galactagogue.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

BRIEDELIA Willd.

210. Briedelia retusa (L.) A. Juss., Euphorb. Gen. 109. 1824; Hook. f., Fl. Brit. India 5: 268. 1887p.p.; Gamble, Fl. Pres. Madras 1280(896). 1925; Fyson, Fl.

South Indian Hill St. 3: t. 491. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 223.1987; Chakrabarty et al., Journ. Econ. Tax. Bot. 26: 321. 2002. *Clutia retusa* L., Sp. Pl. 1475. 1753. *Briedelia spinosa* (Roxb.) Willd., Sp. Pl. 4:979.1806. *Briedelia crenulata* Roxb., Fl. Ind. 3: 734. 1832. *Briedelia roxburghiana* (Muell.-Arg.) Gehrm., Bot. Jahrb. Syst. 41. 95: 30. 1908; Gamble, Fl. Pres. Madras 1280(896). 1925. *Briedelia airy-shawii* P. T. Li, Acta Phyt. Sin. 20: 117. 1982, nom. illeg. **(PLATE 23: 198)**

Common names: Gunige, Komanji, Koyamarwa (K); Asuvamaram, Kaini, Kasi, Kadukumaram, Komanji, Mukkayini, Mullumaruthu, Mulluvenga, Mullankkayini (M); Adamaruthu, Asavai, Kaduga, Mullumarathu, Mullu vengai (T).

Distribution: Indo-Malaya. *Habitat*: Evergreen forests.

Deciduous trees. Leaves simple, alternate; stipules 7 mm long, lateral, lanceolate, deciduous; petiole 9-15 mm long, stout, pubescent when young; lamina 5-22 x 3-11 cm, broadly elliptic-oblong, obovate-oblong, base round, obtuse, truncate, cordate or acute, apex obtuse retuse or subacute, margin entire or slightly crenulate, coriaceous. Flowers unisexual; greenish-yellow, sessile or shortly pedicellate, crowded in dense axillary or terminal, some times paniculate spikes; bracts scaly. Male flowers: 7 mm across, tepals 10, biseriate, valvate; outer tepals 3 mm long, ovate-lanceolate, thick, truncate, shortly connate, acute, inner ones 2 mm, obovate, cuneate, obtuse, fimbriate. Stamens 5, monadelphous, born on a gonophore, exserted; pistillode bifurcate; disc annular. Female flowers: 6.5 mm across, tepals 10, biseriate, lanceolate, valvate; outer and inner 2.5 and 1.5 mm long, coriaceous, puberulous without, truncate, shortly connate, fimbriate, acute; ovary half inferior, globose, 2 x 1 mm, 2-locular, ovules 2 in each cell; styles 2, forked, 2 mm; stigmatiferous; disc with an inner, membranous, fimbriate corona enclosing basal part of ovary. Fruit a drupe, 7-8 mm across, purplish-black, seated on the persistent, slightly enlarged calyx, pyrenes 2, epicarp crustaceous; seed one in each pyrene.

Flowering & Fruiting: August - December.

Utility: Used in Ayurveda, Folk and Siddha medicine. Bark and root used for pain in lumbago and sciatica.

Propagation: Seeds are short lived (1-6 months). Sowing the seeds seem to be best in March. Germination percentage is of about 75%.

Notes: Found in all types of forests, it is not a typical shola tree and seen along the margin of shola forests, especially the slopes or edges ± 1600 m, common in Kunjapanai.

PSU & NKK, Thaivamala, 08.02.1991, c 76 & Kalhatty, 27.03.1991, L c 15 (Cairn Hills); KNS, Burliar, 22.02.1977, 6549 (FRC).

CROTON L.

211. Croton laccifer L., Sp. Pl. 1005. 1753, "lacciferum"; Gamble, Fl. Pres. Madras 1315(920). 1925; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 225.1987. *Croton aromaticus* sensu Hook. f., Fl. Brit. India 5: 338. 1887,p.p. non L. 1753; Fyson, Fl. South Indian Hill St. 3: t. 500. 1920; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 212. 2007. **(PLATE 23: 199)**

Common names: Theppadi (M); Teppadi (T).

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Shrubs, branchlets stellate, brown tomentose. Leaves to 12 x 6 cm, ovate, acuminate, cordate at base, 3-ribbed from base, glands 2 pairs; upper leaves with acute base; petiole 2-3 cm long. Racemes 10 cm long, solitary or paired, densely stellate hairy. Female flower 7 mm across; sepals ovate, acute; petals obovate, ciliate; styles 3, each dichotomously divided, glabrous. Male flowers many, similar to female flowers; stamens 20, filaments bearded. Capsule 1 cm across, globose, densely stellate hairy.

Flowering & Fruiting: April - August.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Kodanad.

EUPHORBIA L.

212. Euphorbia rothiana Spreng., Syst. Veg. 3: 796. 1826; Hook. f., Fl. Brit. India 5: 263. 1887; Gamble, Fl. Pres. Madras 1278(894). 1925; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 229.1987. **(PLATE 23: 200)**

Common names: Merasupalchedi (M).

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Subshrubs, stem glaucous, glabrous. Leaves alternate, opposite or whorled, 6-10 x 2 cm, apex acute, base attenuate into a short petiole, entire, glabrous, glaucous below. Cyathium 2 x 2 mm, in terminal panicled cymes, 5-glandular around the rim of

involucre. Male florets many, filaments glabrous. Ovary long-stalked. Capsule 3 x 3 mm, cocci 3, globular, smooth; seeds 2.5 x 2 mm, obovoid, smooth.

Flowering & Fruiting: March- April.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Pykara.

PSU & NKK, Kodapamund, 27.01.1991, a 14 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 233 (TNFDH).

GLOCHIDION J.R. & G. Forst.

1. Branchlets hairy .... *G. heyneanum*
1. Branchlets glabrous 2

2. Leaves coriaceous, base unequal; style truncate .... *G. candolleanum*
2. Leaves membranous, base equal; style conical .... *G. ellipticum*

213. Glochidion candolleanum (Wight & Arn.) Chakrab. & Gangop., Journ. Econ. Tax. Bot. 19: 191. 1995; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 347. 2007. *Lobocarpus candolleanus* Wight & Arn., Prodr. 1: 7. 1834. *Glochidion neilgherrense* Wight, Ic. 5: 229. 1852; Hook. f., Fl. Brit. India 5: 316. 1887; Gamble, Fl. Pres. Madras 1307(914). 1925; Fyson, Fl. South Indian Hill St. 3: t. 494. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 231.1987. *Glochidion arboreum* Wight, Ic. t. 1907. f.1. 1852; Hook. f., Fl. Brit. India 5: 316. 1887; Gamble, Fl. Pres. Madras 1307(914). 1925. *Glochidion sisparense* Gamble, Fl. Pres. Madras 1307(914). 1926. **(PLATE 23: 201)**

Common names: Kadusurige, Hanike (K); Chendana, Chathakkadambu (M).

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Trees, up to 8 m tall; branchlets more or less 3-angled, tomentose. Leaves alternate, oblong or ovate-oblong, acute, base obtuse, tomentose along veins below, to 9 x 3.5 cm; unequal; lateral nerves 6-8 pairs; arched and prominent beneath; petiole ca 5 mm long; stipules lanceolate. Flowering branches slender, zig-zag, in axillary dense clusters, greenish-yellow. Male flowers with ca 1 cm long pedicel. Female flowers subsessile. Perianth lobes 6, linear oblong, glabrous. Stamens 3. Ovary pubescent, 5-locular; ovules 2 in each cell; style shortly excerted, pubescent. Capsule ca 1 cm across, depressed-globose, 5-6-valved, pubescent, persistent, 4-6 lobed; seeds angular.

Flowering & Fruiting: December - March.

Propagation: The seeds are viable for two weeks, well matured fruits are collected from healthy trees, crushed and the red/orange colour seeds are separated. Then the seeds are dried in sunlight and sown in mother beds containing standard medium. Germination percentage is of 25%.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Nanjanad, 15.02.1991, a 16 (Cairn Hills); KNS, Kodanad, 07.05.1963, 411 (FRC).

214. Glochidion ellipticum Wight, Ic. t. 1906. 1852; Hook. f., Fl. Brit. India 5: 321. 1887; Gamble, Fl. Pres. Madras 1308(915). 1925; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 231.1987; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 19: 199. 1995; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 348. 2007. *Phyllanthus malabaricus* Muell.-Arg., Linnaea 34: 69. 1865 & in Flora 48: 386. 1865 & in DC., Prodr. 15: 305. 1866. *Glochidion malabaricum* (Muell.-Arg.) Bedd., Fl. Sylv. 193. 1872; Hook. f., Fl. Brit. India 5: 319. 1887; Gamble, Fl. Pres. Madras 1308(915). 1925. **(PLATE 23: 202)**

Common names: Bhoma (E); Chendana, Chathakkadambu, Kulachan, Njanjetti (M).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Trees, to 15 m high; branchlets sometimes sparsely puberulous when young, soon glabrous. Leaves simple, alternate, distichous; stipule lateral; petiole 2-9 mm long, stout, glabrous; lamina 4-17 x 1.5-9 cm, elliptic, oblong, elliptic-oblong, elliptic-lanceolate, oblong-lanceolate, subfalcate or obovate, base acute, attenuate, round or oblique, apex apiculate to acuminate or obovate, margin entire, coriaceous, glabrous, glossy. Flowers unisexual, yellow, in dense clusters from leafscars. Male flowers: pedicels 5-17 mm long, filiform; tepals 3+3, 1.5-5 x 0.3-2 mm, ovate, elliptic, triangular, oblong, linear or spathulate. Stamens 3-4, 1-1.5 mm long, connate by their connectives in a column; connectives produced. Female flowers: sessile or pedicels 1-5 mm; tepals 3+3, 1-3 x 0.5-1 mm, linear, oblong, elliptic or triangular, occasionally sparsely puberulous; ovary superior, 0.5-1 mm across, subglobose, usually 4 locular, ovules 2 in each cell, densely hispid; style 2-3 mm, columnar to conical, sometimes obconic; lobes corresponds to locules, subosrbicular, oblong or linear, occasionally bilobulate, erect or spreading. Fruit a capsule 3-10 x 6-15 mm, depressed, unlobed or shallowly to deeply lobed with the lobes rounded or bilobular, crustaceous, hirsute; seeds brown, glabrous; pedicels 2-8 mm.

Flowering & Fruiting: January - July.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Mukurthi.

215. Glochidion heyneanum (Wight & Arn.) Wight, Ic. t. 1908. 1852; Hook. f., Fl. Brit. India 5: 323. 1887; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 19: 205. 1995; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 348. 2007. *Gynoon heyneanum* Wight & Arn., Edinb. New Phil. J. 14: 300. 1833 & in Dietr., Syn. Pl. 5: 388. 1852. *Glochidion velutinum* Wight, Ic. t. 1907. f.2. 1852; Hook. f., Fl. Brit. India 5: 322. 1887; Gamble, Fl. Pres. Madras 1307(914). 1925; Fyson, Fl. South Indian Hill St. 3: t. 496. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 231.1987. **(PLATE 23: 203)**

Common names: Chathakkadambu, Kayara (M); Panickavu (T).

Distribution: India, Himalaya, Bangladesh and Myanmar. *Habitat*: Shola border.

Tomentose trees, to 7 m high; branchlets brown. Leaves simple, alternate, distichous; stipules lateral; lamina 3-15 x 1.5-8 cm, elliptic, elliptic-oblong, elliptic-lanceolate or elliptic-ovate, base acute or oblique, apex acute, obtuse or acuminate at apex, margin entire, coriaceous, densely to sparsely puberulous to glabrous above and velvety tomentose beneath; petiole 3-6 mm, slender, tomentose. Flowers unisexual, yellow, solitary or few together in axillary clusters. Male flowers: pedicels 5-14 mm long, filiform, tepals 3-3, 1.5-4 x 0.8-2 mm, oblong, lanceolate or oblanceolate, tomentose; stamens 3, 1-2 mm long, connate by their connectives in a column; connectives produced. Female flowers: pedicel 1-5 mm long, filiform tomentose; tepals 3+3, oblong, ovate, triangular, lanceolate or linear, densely tomentose; ovary superior, 1-1.5 mm across, subglobose, 3-6 locular; ovules 2 in each cell; style 1-3 mm long, columnar to clavate or occasionally obconic or sometimes free and forming globose mass of connivent lobes; apical lobes 3-6, orbicular, elliptic, oblong or triangular often bilobulate. Fruit a capsule 3-5 x 6-12 mm, depressed, deeply lobed with bilobulate lobes, tomentose; seeds 5-7, 2 x 2.5 mm, grey, smooth; pedicels 5-10 mm long.

Flowering & Fruiting: March - November.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

PSU & NKK, Nanjanad, 12.02.1991, a 17 (Cairn Hills).

216. Macaranga indica Wight, Ic. t. 1883. 1852; Hook. f., Fl. Brit. India 5: 446. 1887; Gamble, Fl. Pres. Madras 1326(927). 1925; Fyson, Fl. South Indian Hill St. 3: t. 502. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 233.1987; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 141. 2007. **(PLATE 24: 204)**

Common names: Malavetta, Puthatamara, Uppotti, Vatta, Vattakkanni (M); Vattakkanni, Vattuthamarai, Uttathamarei (T).

Distribution: South and South East Asia. *Habitat*: Shola forests.

Gregarious trees; branchlets fulvous tomentose, glaucous. Leaves simple, alternate; stipules large, lateral, densely pubescent, deciduous; petiole 12-22 cm long, stout, pubescent; lamina 15-30 x 12-25 cm, ovate-orbicular or deltoid-ovate, base peltate, apex acuminate, margin entire or toothed, glabrous above and tawny-pubescent, intermingled with yellowish glands beneath; 2 large glands near the petiolar insertion above, coriaceous; 8-10 ribs from base, palmate, prominent. Flowers unisexual, yellow, in axillary panicles having zig-zag branches; bracts small with a large, flat glandular appendage. Male flowers: tepals 3, initially connate, later spreading, concave, ovate, valvate, acute, glandular; stamens 6-8, shortly connate below, exserted; anthers 4-celled. Female flowers: tepals 4, lanceolate, basally connate at base, valvate, acute, glandular; ovary superior, 2-6-celled, globose, echinate, ovules one in each cell; style lateral; stigma acute. Fruit a capsule, 7-8 mm across, globose, echinate; seeds black.

Flowering & Fruiting: October - December.

Utility: Used in Folk and Siddha medicine. Decoction of leaves and bark used as vulnerary. Gum used for venereal sores.

Propagation: The seeds are viable for two weeks. Healthy, matured seeds collected are dried in sunlight for 1 or 2 days and sown in mother bed. Germination is recorded from 35 days onwards. Germination is of about 20%.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

PSU & NKK, Naduvattam, 08.02.1991, a 19 (Cairn Hills).

217. Mallotus philippensis (Lam.) Muell.-Arg., Linnaea 34: 196. 1865; Hook. f., Fl. Brit. India 5: 442. 1887, "philippinensis"; Gamble, Fl. Pres. Madras 1322(924). 1925; Fyson, Fl. South Indian Hill St. 3: t. 501. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 234.1987; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 150. 2007. *Croton philippensis* Lam., Encycl. 2: 206. 1786. *Mallotus philippensis* (Lam.) Muell.-Arg. var. *tomentosus* Gamble, Fl. Pres. Madras 1322(924). 1925. **(PLATE 24: 205)**

Common names: Monkey face tree, Kamala tree (E); Kumkumada mara (K); Chenkolli, Kapila, Kuramaddaku, Kurangumanjal, Manjanampottu, Noorimaram, Ponoo, Ponnakam, Shenkolli, Sindooram, Thavatta (M); Kamala, Kapila, Kum-kum, Korangu-manjanatthi (T).

Distribution: Indo-Malesia and Australia. *Habitat*: Shola border.

Dioecious trees, to 12 m high; branchlets, young leaves and inflorescence tawny or rusty pubescent. Leaves simple, alternate; stipules lateral, cauducous; petiole 7-60 mm long, stout, swollen at base, fulvous-pubescent with 2 small sessile glands on each side of the submit; lamina 5-20 x 2-8 cm, ovate or ovate-lanceolate, base acute or round, apex acuminate or acute, margin entire or sparsely serrate, glabrous above, greyish pubescent to fulvous tomentose with minute red glands beneath; coriaceous; 3-ribbed from base. Flowers unisexual, brick red, in rusty puberulous, terminal spicate panicles. Male flowers: 4.5 mm across; tepals 4, lanceolate, stamens many. Female flowers: 4 mm across, tepals 3 or 4, thicker than in males, ovate-lanceolate; ovary with red glands, superior, 3-celled, ovules one in each cell; styles 3, to 3.5 mm long, papillose. Fruit a capsule, 7-8 mm across, globose, 3-lobed, loculicidally 3-valved, densely red-glandular, pubescent; seeds 1-4, globose, glabrous, black.

Flowering & Fruiting: October - March.

Utility: Used in Ayurveda, Folk, Homeopathy, Siddha and Unani systems of medicine. Glandular hair from fruits yield a reddish powder used as an anthelmintic and useful in cutaneous affections. It is also used against tapeworms, abdominal disorders, haemopathy, calculus, flatulence, leprosy, skin diseases and ringworm.

Propagation: The seeds are short lived for about 1-6 month. Water soaking is a preferred pre sowing treatment. March to April is the best season for sowing the seeds for

germination. Germination period is of about 30 days. The germination percentage is 15%.

Notes: Found in all types of forests ± 1000 m, common in Gethai.

PSU & NKK, Naduvattam, 08.02.1991, a 20 (Cairn Hills); KNS, Burliar, 23.02.1977, 6607 (FRC).

PHYLLANTHUS L.

1. Anthers erect, dehiscing vertically .... ***P. rheedei***
1. Anthers not erect, dehiscing transversely .... ***P. macraei***

218. Phyllanthus macraei Muell.-Arg., Linnaea 32: 29. 1863; Hook. f., Fl. Brit. India 5: 269. 1887; Gamble, Fl. Pres. Madras 1290(902). 1925; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 237.1987; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 378. 2007. *Macraea rheedei* Wight, Ic. t. 1901. 1852, non *Phyllanthus rheedei* Wight, 1852.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Roadsides.

Shrubs. Leaves 1.5-2.5 x 1-2 cm, elliptic-oblong, obtuse at apex, broadly attenuate at base, glaucous below; nerves 6-8 pairs. Stipules peltate subsagittate, 0.15-0.2 cm long, white, serrate on margins. Male flowers 0.1-0.15 cm across. Tepals 5. Ovary 0.15 cm across cell. Capsule globose, 0.25-0.3 cm across.

Flowering & Fruiting: August - December.

Utility: Used in Folk medicine.

Notes: Found in the rocky slopes of sholas ± 1100 m, common in Kalhatti.

219. Phyllanthus rheedei Wight, Ic. t. 1895. f. 1. 1852, 'rheedii'; Hook. f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Pres. Madras 1289(902). 1925; Fyson, Fl. South Indian Hill St. 3: t. 492. 1920; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 238.1987; N.P.Balakr. & Chakrab., Fam. Euphorbiaceae India 379. 2007. *Phyllanthus kozhikodianus* Sivar. & Manilal, J. Indian Bot. Soc. 56. 165. 1977. **(PLATE 24: 206)**

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Woody herbs, to 80 cm high; stems glabrous. Leaves to 2.5 x 1.5 cm, obovate, obtusely acute, distant on lateral branchlets, glaucous beneath; nerves 7-9 pairs, stipules lanceolate, acuminate; petiole 2 mm long. Flowers solitary or fascicled. Sepals 6, 4.5

x 2 mm, obovate, obtuse, green with narrow white margins, glabrous. Ovary globose, styles 3, bifid, radiating. Capsule 5 mm across, glabrous, smooth; seeds 2 x 1.5 mm, trigonous, longitudinally striate with minute cross bars.

Flowering & Fruiting: November - January.

Utility: Used in Folk medicine. Whole plant is useful in hepatitis.

Notes: Along roadsides and waste places ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 20.07.1994, 156 (TNFDH); MPRR, Nilgiris, 16.10.1929, 21032 (FRC).

38. FABACEAE – LEGUMINOSAE (PAPILIONOIDEAE)

1. Plants armed .... ***Ulex***
1. Plants unarmed **2**

2. Woody climbers or twiners **3**
2. Herbs or shrubs **7**

3. Leaves 3- foliolate **4**
3. Leaves 5-many foliolate .... ***Derris***

4. Leaves gland-dotted beneath; style beared **5**
4. Leaves not glanded, style not beared **6**

5. Ovules more than 3 .... ***Cajanus***
5. Ovules 1-2 .... ***Flemingia***

6. Plants pubescent, flowers purple, calyx teeth distinct .... ***Shuteria***
6. Plants glabrous, flowers yellow, calyx truncate .... ***Dumasia***

7. Prostrate herbs in marshy areas **8**
7. Herbs or shrubs not in marshy places **10**

8. Leaves pinnate .... ***Smithia***
8. Leaves tri-foliolate **9**

9. Flowers solitary, pod linear 2-valved .... ***Parochetus***
9. Flowers in globose heads, pod minute, indehiscent .... ***Trifolium***

10. Anthers dimorphic, alternately basifixed and shorter dorsifixed .... ***Crotalaria***
10. Anthers uniform **11**

11. Stems 5-angled; flower axillary, solitary .... ***Cytisus***
11. Stems not angled; flowers more than one **12**

12. Pods articulated **13**
12. Pods not articulated **14**

13. Clayx glumaceous, striate .... ***Alysicarpus***
13. Calyx neither glumaceous nor striate .... ***Desmodium***

14. Flowers in axillary racemes, stamens diadelphous .... ***Indigofera***
14. Flowers in terminal racemes, stamens free, slightly connate at base .... ***Sophora***

ALYSICARPUS Neck. ex Desv

220. Alysicarpus racemosus Benth., Linnaea 24: 642. 1851; Gamble, Fl. Pres. Madras 339(240). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 91.1983; Sanjappa, Legumes Ind. 80. 1992. *Alysicarpus belgaumensis* Wight var. *racemosus* (Benth.) Baker in Hook.f., Fl. Brit. India 2: 160. 1876. **(PLATE 24: 207)**

Distribution: India. *Habitat*: Grasslands and scrub jungles.

Erect herbs; stem sparsely appressed hairy. Leaves alternate, lower 1-foliolate, upper ones 3-foliolate; leaflets 4.3 x 1.3 cm, obovate or suborbicular, obtuse, rounded or slightly cordate at base, entire, glabrous; petioles slightly winged. Raceme covered with hooked hairs. Flowers small, purple coloured; pedicel slender. Calyx covered with brown hairs. Petals purple. Pod 3-4 jointed, slightly exserted, glabrous.

Flowering & Fruiting: November - December.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

CAJANUS DC.

1. Erect shrubs; flowers in pairs .... ***C. trinervius***
1. Climbing shrubs; flowers in short racemes .... ***C. rugosa***

221. Cajanus rugosus (Wight & Arn.) van der Maesen, Agric. Univ. Wageningen Pap. 85-84:179. 1985; Sanjappa, Legumes Ind. 100. 1992. *Atylosia rugosa* Wight & Arn., Prodr. 257. 1834; Hook. f., Fl. Brit. India 2: 215. 1876; Gamble, Fl. Pres. Madras 369(260). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 317.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 92.1983. **(PLATE 24: 208)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Climbers; stems ridged, tomentose. Leaflets 3.5 x 3 cm, obovate, acute at base, reticulate below, densely tomentose on both sides; petiole 3-4 cm long. Raceme to 4

cm long, peduncled. Flowers 3-5, yellow; calyx 7 mm long, lobes ovate, acute, densely hairy outside; standard 10 x 8 mm, retuse, auricled, yellow with red lines; wings 8 x 3 mm, obovate; keel 9 mm long, gibbous to one side.

Flowering & Fruiting: November - December.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

PSU & NKK, Kodanad,14.11.1994, 609 (TNFDH).

222. Cajanus trinervius (DC.) van der Maesen, Agric. Univ. Wageningen Pap. 85-4: 199. 1985; Sanjappa, Legumes Ind. 100. 1992. *Collaea trinervia* DC., Mem. Leg. 247. 1826. *Atylosia trinervia* (DC.) Gamble, Wight & Arn. Prain, J. Asiat. Soc. Bengal 66: 45. 1897; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 93.1983; Gamble, Fl. Pres. Madras 368(260). 1918. *Atylosia candollei* Wight & Arn., Prodr. 257. 1834; Baker in Hook.f., Fl. Brit. India 2: 212. 1876; Fyson, Fl. South Indian Hill. St. 3: t. 89.1920. **(PLATE 24: 209)**

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Shrubs, densely golden brown pubescent. Leaflets to 6 x 2.2 cm, elliptic, apex obtuse, mucronate, base obtuse, pubescent above and tomentose below, glabrous above when mature, basally tri-nerved, lateral oblique at the base, ovate, elliptic, smaller; petiole 1.5 cm, petiolule 2 mm, tomentose, stipules 8 mm, triangular, acuminate. Racemes 1-2 flowered, pubescent; calyx tube 5 mm, lower teeth 7 mm, lanceolate, tomentose; petals yellow, standard petals 2 x 0.9 cm, obovate, circular, clawed; wings 15 mm, obovate; keels clawed; staminal tube 14 mm; ovary 5 mm, densely pubescent. Pod 3-4 seeded, 3 x 1.2 cm, oblong, constricted, densely pubescent.

Flowering & Fruiting: November - January.

Notes: Found in the ecotone region of sholas ± 1900 m, common in Muthorai.

PSU & NKK, Kodanad, 30.11.1994, 373 (TNFDH).

CROTALARIA L.

1. Prostrate herbs **2**
1. Erect herbs or shrubs **3**

2. Leaves linear, oblanceolate, 1.5 x o.5 cm, hairy below .... ***C. albida***
2. Leaves ovate-oblanceolate, 3 x 2 cm, hairy on both sides .... ***C. fysonii***

3. Leaves 3-foliolate .... *C. notonii*
3. Leaves simple 4

4. Plants glabrous 5
4. Plants hairy or tomentose 6

5. Racemes more than 16 flowers, stipules absent .... *C. spectabilis*
5. Racemes with 10 flowers, stipules subulate, deciduous .... *C. obtecta*

6. Racemes few flowered 7
6. Racemes many flowered 8

7. Pods glabrous, 5 x 1.5 cm .... *C. barbata*
7. Pods hairy, 3.5 x 1.5 cm .... *C. scabrella*

8. Flowers densely or silky hairy 9
8. Flowers glabrous 10

9. Flowers in panicles .... *C. madurensis*
9. Flowers in racemes .... *C. calycina*

10. Pods smooth and shiny .... *C. formosa*
10. Pods hairy 11

11. Erect, rusty villose, stipules large .... *C. semperflorens*
11. Semi scandent, adpressed pubescence stipules small .... *C. walkeri*

223. Crotalaria albida Heyne ex Roth, Nov. Pl. Sp. 333.1821; Hook. f., Fl. Brit. India 2: 71. 1876; Gamble, Fl. Pres. Madras 295(208). 1918; Fyson, Fl. South Indian Hill St. 2: t. 78. 1932; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 95.1983; Sanjappa, Legumes Ind. 116. 1992; Ansari, Crotalaria India 153. 2008. *Crotalaria montana* Roxb., Fl. Ind. 3: 365. 1832. **(PLATE 24: 210)**

Common names: Hill Rattlewort (E).

Distribution: Indo-Malesia. *Habitat*: Grasslands.

Diffuse herbs; branches radiating from a perennial stout root stock. Leaves to 1.5 x 0.5 cm, oblanceolate, obtuse, hairy below. Racemes to 6 cm long, terminal; bracts and bracteoles minute. Flowers 10 mm long, yellow; calyx 9 mm long; lobes unequal; standard 8 mm across, orbicular, hairy on back; wings 8 x 3 mm, rugose; keel glabrous. Pods 9 x 3 mm, obovate, glabrous; seeds few.

Flowering & Fruiting: December - January.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Parsons valley.

PSU & NKK, Kodanad, 20.09.1994, 168 & 21.11.1995, 604 (TNFDH).

224. Crotalaria barbata Graham ex Wight & Arn., Prodr. 181.1834; Hook. f., Fl. Brit. India 2:76.1876; Gamble, Fl. Pres. Madras 294 (207). 1918; Fyson, Fl. South Indian Hill St. 2: t. 80.1932; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 95.1983; Sanjappa, Legumes Ind. 116.1992; Ansari, Crotalaria India 77. 2008.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs, to 2 m high; stems terete, densely adpressed hairy. Leaves to 12 x 4 cm, elliptic to oblanceolate, obtuse at apex, densely hairy below; petiole 5 mm long. Racemes to 20 cm long, terminal. Flowers 3-7 in a racemes; pedicels 2 cm long; bracts ovate; calyx 15 mm long, lobes linear, densely hairy; standard 2 cm across, orbicular, tomentose along back; wings 1.5 cm long; keel densely tomentose along the margins. Pods 45 x 13 mm, glabrous; seeds many, 4.5 x 4 mm, black.

Flowering & Fruiting: November - January.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Snowdown.

PSU & NKK, Kodanad, 28.08.1995, 310 (TNFDH).

225. Crotalaria calycina Schrank, Pl. Rar. Hort. Monac. t.12. 1817; Hook. f., Fl. Brit. India 2: 72. 1876; Gamble, Fl. Pres. Madras 295(209). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 309.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 96.1983; Sanjappa, Legumes Ind. 118. 1992; Ansari, Crotalaria India 82. 2008. **(PLATE 24: 211)**

Common names: Bekkina tharudu gida (K).

Distribution: Paleotropics. *Habitat*: Grasslands.

Low shrubs with scandent branches; stems adpressed hairy. Leaves 7 x 1.5 cm, elliptic, densely hairy below; stipule subulate. Racemes terminal, many-flowered; bracts 1.5 cm long, lanceolate; bracteoles similar. Flowers distant; calyx 2.5 cm long, deeply lobed; lobes linear, densely hairy without; standard 15 mm long, yellow, hairy on back. Pods 2 cm long, oblong, glabrous.

Flowering & Fruiting: August - December.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Parsons valley.

PSU & NKK, Kodanad, 10.05.1994, 555 & 21.11.1995, 372 (TNFDH).

226. Crotalaria formosa Graham ex Wight & Arn., Prodr. 186. 1834; Hook. f., Fl. Brit. India 2: 76. 1876; Gamble, Fl. Pres. Madras 294(207). 1918; Fyson, Fl. South Indian Hill St. 2: t. 79. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 96.1983; Sanjappa, Legumes Ind. 120. 1992; Ansari, Crotalaria India 263. 2008. **(PLATE 24: 212)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs, stem dwarfed, much branched, covered with tawny hairs. Leaves simple alternate, 4-5 x 2-2.5 cm, obovate, mucronate, narrowed to the short stalk, dark green above, silky below and brown with tawny hairs on the veins; stipules 5 mm long, narrow and curved downwards. Racemes 2.5-5 cm long and as broad, in very dense, silky, yellow; pedicels short. Calyx teeth 6-8 mm long, shaggy, acute. Petals rather small, not much longer than the calyx, the standard streaked with brown veins. Pod distinctly stalked, at first black, afterwards green and finally straw-coloured, about 3 x 0.5 cm, smooth and shiny, and frilled below by the dried calyx.

Flowering & Fruiting: December - March.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Dodabetta.

227. Crotalaria fysonii Dunn, Bull. Misc. Inform. Kew 1914: 26. 1914, var. **fysonii**; Gamble, Fl. Pres. Madras 292 (206). 1918; Fyson, Fl. South Indian Hill St. 2: t. 74. 1932; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 97.1983; Sanjappa, Legumes Ind. 120. 1992; Ansari, Crotalaria India 179. 2008. **(PLATE 25: 213)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Perennial, prostrate herbs, 15-35 cm long with woody base and rootstock; branches trailing, often ascending, terete, slightly ridged, softly hirsute. Leaves simple, 1.0-3.2 x 1-2 cm, ovate, orbicular-ovate or orbicular, obtuse at base, acute, obtuse, rounded or rarely retuse and mucronate at apex, adpressed hirsute on both surfaces, margins involute, ciliate; stipules linear or linear-lanceolate, 1-2 mm long. Flowers 3-8, in terminal racemes; bracts ovate or ovate-lanceolate, 2.5-5.0 mm long, acute or

acuminate at apex, distinctly veined, hirsute. Calyx 5-lobed with short tube, obscurely 2-lipped, lobes equal, 1.0-1.4 x 0.2-0.3 cm, upper lip 2-lobed, lobes lanceolate, acuminate at apex, lower 3-lobed, lobes linear-lanceolate, densely hirsute. Petals bright yellow, well exserted, standard orbicular, ca 1.5 x 1.8 cm, veins reddish-brown, often reflexed with short claw; wing petals oblong, 1.3-1.5 x 0.6-0.7 cm, obtuse at apex and abruptly narrowing in short claw; keel petals ovate, ca 1 x 0.7 cm, beak narrow, twisted, short, margins ciliate. Staminal sheath ca 8 mm long; anthers dimorphic, longer anthers oblong, ca 2 mm long and shorter anthers ovoid-oblong, ca 0.5 mm long. Ovary oblong, ca 7 mm long, hirsute on one side only, shortly stalked; style 5-8 mm long, geniculate; stigma globose; ovules 4-15. Pods obovate-oblong or elliptic-oblong, 1.5-3.0 x 0.5-1.0 cm, cylindrical, densely hirsute, hairs up to 2 mm long, brown; seeds 2-13, reniform, 2-4 x 2.0-3.5 mm, brown or blackish, polished.

Flowering & Fruiting: September - November.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 10.10.1994, 220 (TNFDH).

228. Crotalaria madurensis Wight ex Wight in Wight & Arn., Prodr. 184. 1834; Hook. f., Fl. Brit. India 2: 79. 1876; Fyson, Fl. South Indian Hill St. 2: t. 82. 1932; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 98.1983; Sanjappa, Legumes Ind. 123. 1992; Ansari, Crotalaria India 235. 2008.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Silky-tomentose shrubs. Leaves simple, alternate, 9.5 x 5 cm, elliptic-oblanceolate, obovate or ovate-oblong, broadly rounded or cuneate at base, subacute or obtuse and apiculate at apex, margins ciliate, densely softly golden sericeous on both surfaces. Panicles terminal and axillary, leafy. 15-30 cm long. Flowers numerous, ca 3 cm long; bracts alternate, ovate-lanceolate or broadly ovate, 0.8-1.0 cm long, acuminate, deeply cordate, amplexicaul, trinerved, yellowish, silky pubescent without, glabrous within, subdeciduous; bracteoles like bracts and adpressed to calyx. Calyx deeply lobed, tube 3.5-4.0 mm long, lobes equal or obscurely 2-lipped, divided to base, upper lip 2-lobed, lobes ovate or elliptic, cordate at base, trinerved, lower 3-lobed, lobes linear-lanceolate or lanceolate, yellowish-brown, densely silky-pubescent. Petals yellow, twice as long as calyx; vexillum ovate-suborbicular, 2-3 x 1.5 cm, hairy on the back and along margins; wing petals obovate or obliquely obovate-oblong, ca 2 x 0.8 cm, glabrous; keel petals ovate, ca 2 x 1 cm, beak twisted, hairy on the back and on

the margins up to the middle. Staminal sheath 7-8 mm long, sericeous at the apex; free filaments 1-2 cm long; longer anthers oblong, ca 3 mm long; shorter anthers ovoid, ca 0.7 mm long. Ovary sessile or shortly stalked, densely pubescent; style up to 2 cm long; ovules 14-16. Pods subsessile, oblong, 2.5-3.0 cm long, yellowish, pubescent; seeds 10-12.

Flowering & Fruiting: August - December.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

229. Crotalaria notonii Wight & Arn., Prodr. 192. 1834; Hook. f., Fl. Brit. India 2: 82. 1876; Gamble, Fl. Pres. Madras 300(212). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 311.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 98.1983; Sanjappa, Legumes Ind. 125. 1992; Ansari, Crotalaria India 309. 2008. **(PLATE 25: 214)**

Distribution: india. *Habitat*: Shola border.

Erect shrub; branches divaricate, yellowish-tomentose. Leaves 3-foliolate, to 4.5 cm wide; petiole to 2 cm; stipules narrow-subulate, 0.4 cm; leaflets cuneate-obovate, to 2.5 x 0.8 cm, mucronate, glabrous above, adpressed-silky hairy below. Racemes terminal, also leaf-opposed, to 5 cm long, 10-20 flowered, compact; bracts linear. Flowers 1 cm long. Calyx 4.5 mm, thin-silky; lobes lanceolate, equal to tube. Corolla yellow; standard 7 x 5 mm; wings 8 x 2.5 mm; keel 6 x 2.5 mm, with a long beak. Stamens 5 + 5; sheath 2 mm. Pod 8 x 5 mm, thin-silky; seed 2.3 mm.

Flowering & Fruiting: September - January.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

230. Crotalaria obtecta Graham ex Wight & Arn., Prodr. 185. 1834, var. **obtecta**; Hook. f., Fl. Brit. India 2: 79. 1876; Gamble, Fl. Pres. Madras 297(210). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 99.1983. **(PLATE 25: 215)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Woody undershrubs. Leaves 3.5-7 x 2-4 cm, elliptic ovate to obovate, obtuse at apex, cuneate at base, velvetty below when young, sparsely hairy on ageing; stipules 0.5-0.7 cm long, subulate, deciduous. Racemes many-flowered. Calyx 2-2.5 cm long, lobes 5, densely brown hairy. Corolla yellow, 2-2.5 cm long; standard with few lines

of brown hairs; wings with scaly folds; keels cottony on the inner margins. Stamens 10, linear, sagitate; sheath 0.8-1 cm long, filaments free, 0.8-1 cm long. Ovary 0.5-0.6 cm long, ovoid, densely brown hairy; style 2-2.3 cm long, incurved, brown silky; stigma hairy on inner side; ovules many. Pods 4-5 x 1.5-2 cm, oblong. Seeds many, 0.4-0.5 cm diam., compressed.

Flowering & Fruiting: December - March.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

231. Crotalaria scabrella Wight & Arn., Prodr. 181. 1834; Gamble, Fl. Pres. Madras 291(205). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 100.1983; Sanjappa, Legumes Ind. 128. 1992; Ansari, Crotalaria India 67. 2008. *Crotalaria ovalifolia* Wall. ex Fyson, Bull. Misc. Inform. Kew 1914: 184. 1914; Gamble, Fl. Pres. Madras 291(206). 1918; Fyson, Fl. South Indian Hill St. 2: t. 75. 1932. *Crotalaria rubiginosa* Willd. var. *scabrella* (Wight & Arn.) Baker in Hook.f., Fl. Brit. India 2: 70. 1876. **(PLATE 25: 216)**

Common names: Cherukonna (M).

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Erect densely pubescent herbs, to 60 cm high. Leaves 3.5 x 2 cm, obovate, obtuse, mucronate, nerves 2-4 pairs, prominent below; stipules decurrent, 1.2 cm broad, flat above. Flowers 1-3 together in axillary racemes; bracts 6 x 3 mm, ovate; bracteoles 8 x 2 mm, lanceolate; calyx 12 mm long, lobes acuminate, standard 10 mm across; wings 10 mm long, oblong; keel 10 mm long, glabrous. Pods 3.5 x 1 cm, oblong.

Flowering & Fruiting: November – March.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Dodabetta.

PSU & NKK, Wenlockdowns, 26.01.1991, L a 69 & Doddakomba, 10.03.1991, L a 72 (Cairn Hills); PSU & NKK, Kodanad, 10.05.1994, 489 & 14.11.1994, 595 (TNFDH); KNS, Glenmorghan, 11.05.1963, 541(FRC).

232. Crotalaria semperflorens Vent., Descr. Nouv. Jard. Cels. t. 17. 1800; Hook. f., Fl. Brit. India 2: 78. 1876; Gamble, Fl. Pres. Madras 297(210). 1918; Fyson, Fl. South Indian Hill St. 2: t. 81.1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 100.1983; Sanjappa, Legumes Ind. 129. 1992; Ansari, Crotalaria India 280. 2008. *Crotalaria wallichianum* Wight & Arn., Prodr. 187. 1834. **(PLATE 25: 217)**

Distribution: Peninsular India; widely distributed in Malesia. *Habitat*: Shola border.

Shrubs, to 1.5 m high; stems stout, minutely hispid. Leaves to 16 x 2 cm, obovate, obtuse at apex, acute at base, pubescent below; nerves to 10 pairs; petiole 1.5 cm long; stipule 1.5 x 1 cm, lunate. Raceme to 25 cm long; bracts lanceolate, 1 cm long. Flowers many; calyx 2 cm long, lobes lanceolate, hispid; standard 3 x 2 cm, glabrous, yellow; wings 2 x 1 cm, verrucose; keel glabrous. Pods 6 x 2.5 cm, obovate, clawed.

Flowering & Fruiting: December - February.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Dodabetta.

PSU & NKK, Mukurthi, 29.01.1991, c 46 (Cairn Hills).

233. Crotalaria spectabilis Roth, Nov. Pl. Sp. 341. 1821; Babu, Fl. Malappuram Dist. 176. 1990; Sanjappa, Legumes Ind. 130. 1992; Ansari, Crotalaria India 284. 2008. *Crotalaria sericea* Retz., Obs. Bot. 5: 26. 1788; Hook. f., Fl. Brit. India 2: 75. 1876; Gamble, Fl. Pres. Madras 293(207). 1918. *Crotalaria leschenaultii* DC., Prodr. 2: 125. 1825; Hook. f., Fl. Brit. India 2: 76. 1876; Gamble, Fl. Pres. Madras 293(207). 1918; Fyson, Fl. South Indian Hill. St. 3:t. 310.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 98.1983; Ansari, Crotalaria India 270. 2008.

Common names: Cats Bell, Rattleweed, Yellow Crotalaris (E).

Distribution: Paleotropics. *Habitat*: Shola border.

An erect biennial undershrubs upto 1.2 m tall with glabrous, furrowed branches. Leaves 5-15 cm long and variable in width, oblong-lanceolate, apex acute or subacute, mucronate, base cuneate, glabrous above, fine-silky beneath; petioles 1.6-3 mm long; stipules large, ovate-lanceolate, leafy, persistent. Flowers yellow with a purple tinge, borne in elongated 16-50 flowered terminal racemes 25-30 cm long; pedicels longer than the calyx with a large foliaceous ovate-acute bract at the base of each pedicel and a pair of minute bracts on each pedicel below the middle; calyx ca 1.3 cm long, tube campanulate, upper teeth large, triangular, acute, ca 6 mm broad at the base, the lower 3 teeth smaller and less deeply cut, linear-lanceolate, acute; corolla with a broadly ovate standard with a strong midrib at the back. Pod stalked, linear-oblong, 2.5-5 cm long glabrous; seeds 20-30.

Flowering & Fruiting: November - January.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

234. Crotalaria walkeri Arn., Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 328. 1836; Gamble, Fl. Pres. Madras 297(210). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 101.1983; Sanjappa, Legumes Ind. 131. 1992. *Crotalaria semperflorens* Vent. var. *walkeri* (Arn.) Baker in Hook.f., Fl. Brit. India 2: 78. 1876. **(PLATE 25: 218)**

Distribution: South India and Sri Lanka. *Habitat*: Grasslands.

Scandent shrubs; stems thinly hairy. Leaves to 7 x 2.5 cm, lanceolate, acute, apiculate, rounded at base, scabrous along the nerves; stipules 5 mm long, ovate; acuminate, deflexed. Raceme 10-20-flowered, terminal; bracts 6 x 4 mm, ovate-cordate at base, deflexed; bracteoles at the middle of the pedicel. Flowers 3 cm long, standard orbicular, yellow with pink lines, wings and keels smaller. Pods 4 x 2.3 cm, oblong.

Flowering & Fruiting: November - January.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Dodabetta.

CYTISUS Desf.

235. Cytisus scoparius (L.) Link, Enum. Hort. Berol. 2: 241. 1823; Fyson, Fl. South Indian Hill St. 2: t. 73. 1932. *Spartium scoparius* L., Sp. Pl. 709. 1753. *Sarothamus scoparius* (L.) W.D.J. Koch, Syn. Fl. Germ. Helv. (ed. 1) 152. 1837. **(PLATE 25: 219)**

Common names: Scotch broom (E); Kotagiri chedi (T).

Distribution: Native of Mediterranean regions, naturalised in India. *Habitat*: Eucalyptus plantations.

Well-branched shrubs; branches 5-angled. Leaves 3-foliolate at base, simple above, subsessile, adpressed-pubescent; leaflets elliptic-oblong to obovate, 18 x 4 mm. Flower axillary, solitary, 3 x 2 cm; pedicel 1 cm, glabrous. Calyx glabrous, half as long as pedicel; lobes 5 mm, abaxial lobe 2-toothed. Corolla bright yellow, shortly clawed; standard 2 x 2 cm; wings and keels 2 x 1 cm. Stamens 10, monadelphous; sheath 1 cm; 6 stamens longer, 4 shorter. Ovary 1 cm, densely white pubescent with elongate hairs; style 2 cm, curved. Pod to 3.5 x 0.8 cm, black, hairy along sutures.

Flowering & Fruiting: September - December.

Utility: Used in Folk medicine.

Notes: Naturalised in plantations and open areas ± 1900 m, common in Thalakundha. The plant is used for broom.

PSU & NKK, Pykara, 26.01.1991, I c 48 (Cairn Hills); PSU & NKK, Kodanad, 21.11.1995, 109 (TNFDH); KNS, Dodabetta, 11.05.1963, 550 (FRC).

DERRIS Lour.

1. Leaflets oblong-lanceate or oblanceate 10 x 3 cm; pods glabrous .... ***D. canarensis***
1. Leaflets to ovate, 4 x 2 cm, abruptly acuminate; pods tomentose .... ***D. benthamii***

236. Derris benthamii (Thw.) Thw., Enum. Pl. Zeyl. 413. 1864; Gamble, Fl. Pres. Madras 387(273). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 104.1983; Sanjappa, Legumes Ind. 143. 1992. *Brachypterum benthamii* Thw., Enum. Pl. Zeyl. 93. 1859. *Derris paniculata* Benth., J. Linn. Soc. 4 (Suppl.): 105,1860; Hook. f., Fl. Brit. India 2: 242. 1878.

Common names: Ganathe balli (K).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Stout climbers; branchlets densely lenticellate, minutely dark brown hispid. Leaves 7-9-foliolate; leaflets to 4 x 2 cm, ovate, abruptly acuminate, acumen twisted, retuse, pubescent along the nerves below; petiolule hispid. Panicle to 30 x 30 cm, brown-hispid. Flowers many; calyx 4 mm long, oblique at mouth, densely hispid outside, lobes short; standard 10 x 6 mm, clawed, concave, white; keel 10 x 3 mm, oblong, clawed. Pods 3.5 x 2 cm, 1.5 cm thick, densely brown hispid, acute and hooked at apex, acute at base; seeds 1 or 2.

Flowering & Fruiting: December - May.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

237. Derris canarensis (Dalz.) Baker in Hook.f., Fl. Brit. India 2: 246. 1878; Gamble, Fl. Pres. Madras 387(273). 1918; Fyson, Fl. South Indian Hill. St. 3:t. 320.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 104.1983; Sanjappa, Legumes Ind. 144. 1992. *Pongamia canarensis* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 37. 1850. *Brachypterum canarense* (Dalz.) Dalz. in Dalz. & Gibs., Fl. Bombay 176. 1861.

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Climbing shrubs. Leaves ca 25 cm long; petiole 7-9 cm long; leaflets ca16 pairs, oblong-lanceate or oblanceate, 4-10 by 1-3 cm, base subacute or cuneate, apex obtuse, lower surface pubescent in young leaves, thin-coriaceous. Panicle axillary and or terminal, ca 15 cm long. Flowers 3-6 per panicle-branches; standard petal suborbicular with two small callosites at base. Pod flat, oblong, upper suture winged. Seed 1 or 2, reniform.

Flowering & Fruiting: September - January.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

DESMODIUM Desv.

1.	Pod distinctly stalked in the calyx	***D. repandum***
1.	Pod subsessile in the calyx	**2**
2.	Plants prostrate	***D. microphyllum***
2.	Plants erect	**3**
3.	Racemes to 30 cm long; flowers blue	***D. alysicarpoides***
3.	Racemes to 7 cm long; flowers lilac	***D. ferrugineum***

238. Desmodium alysicarpoides van Meeuwen, Reinwardtia 6: 246. 1962; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 105.1983; Sanjappa, Legumes Ind. 149. 1992. *Alysicarpus parviflorus* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 211. 1851; Gamble, Fl. Pres. Madras 339(240). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 314.1920. *Desmodium parviflorum* (Dalz.) Baker in Hook. f., Fl. Brit. India 2: 172. 1876; Fyson, Fl. South Indian Hill St. 2: t. 87. 1932, non Mart. & Galeotti 1843. **(PLATE 25: 220)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Erect or suberect herbs, to 30 cm high; stem villous. Leaflets 4.5 x 2 cm, elliptic acute at apex, rounded at base, tomentose below; laterals much smaller. Racemes to 30 cm long, terminal; pedicels 2 or 3-together. Flowers blue; calyx 4.5 mm long, lobes linear-lanceolate, densely hairy; standard 3 x 2.5 mm, glabrous. Pods curved, 6-jointed, joint 2 x 1.5 mm, straight along one suture, glabrous.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

239. Desmodium ferrugineum Wall. ex Thw., Enum. Pl. Zeyl. 87. 1859, ssp. **ferrugineum**: Ohashi, Ginkgoana 1: 204. 1973; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 105.1983; Sanjappa, Legumes Ind. 153. 1992. *Desmodium polycarpum* (Poir.) DC. var. *fischeri* Gamble, Fl. Pres. Madras 347(245). 1918,p.p. *Desmodium rufescens* sensu Wight & Arn., Prodr. 228. 1834, non DC. 1825; Hook. f., Fl. Brit. India 1: 171. 1876,p.p; Gamble, Fl. Pres. Madras 346(244). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 313.1920. **(PLATE 25: 221)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Shrubs; branchlets silky pubescent. Leaves 3-foliolate; leaflets elliptic to obovate, 7-4 x 0.5-3 cm, base rounded, apex rounded, truncate, mucronulate, lower surface silky pubescent, lateral veins faint. Racemes terminal, ca 7 cm long. Flowers congested; bracts subulate; corolla lilac; stamens 9+1. Pods ca 3 cm long; sparsely pubescent.

Flowering & Fruiting: November - January.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

240. Desmodium microphyllum (Thunb.) DC., Prodr. 2: 337. 1825; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 105.1983; Sanjappa, Legumes Ind. 157. 1992. *Hedysarum microphyllum* Thunb., Fl. Jap. 284. 1784. *Desmodium parvifolium* DC., Prodr. 2: 334. 1825; Hook. f., Fl. Brit. India 2: 174. 1876; Gamble, Fl. Pres. Madras 348(245). 1918. **(PLATE 26: 222)**

Common names: Kattu-avam-poovu (M).

Distribution: India, China, Malesia. *Habitat*: Shola border.

Trailing herbs; branches slender, filiform, pilose. Leaflets to 6 x 3 mm, obovate, emarginate, cuspidate, villous below; petiolule to 3 mm long, slender; stipules 4 mm long, lanceolate. Racemes to 4 cm long, axillary, up to 10-flowered; covered with curved hairs. Flowers pale blue, bracts lanceolate, acuminate, hairy; pedicels to 8 mm long, slander; standard 4 x 4 mm, retuse; keel spurred at base, glabrous; stamens monadelphous. Pods 12 x 3 mm, crenate along both sutures, hispid.

Flowering & Fruiting: November - January.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Mukurthi.

PSU & NKK, Gudalur, 06.03.1991, I c 52 (Cairn Hills).

241. Desmodium repandum (Vahl) DC., Prodr. 2: 334. 1825; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 107.1983; Sanjappa, Legumes Ind. 161. 1992. *Hedysarum repandum* Vahl, Symb. Bot. 2: 82. 1791. *Desmodium scalpe* DC., Prodr. 2: 334. 1825; Hook. f., Fl. Brit. India 2: 165. 1876; Gamble, Fl. Pres. Madras 345 (243). 1918; Fyson, Fl. South Indian Hill St. 2: t. 86. 1932. *Desmodium strangulatum* Wight & Arn., Prodr. 228. 1834. **(PLATE 26: 223)**

Distribution: Paleotropics. *Habitat*: Shola forests

Undershrubs; branches slender. Leaves few; leaflets to 20 x 6 cm, ovate, acuminate, rounded at base, glabrous above, adpressed pubescent below; nerves finely reticulated below; stipules ovate, acuminate. Flowers in panicled racemes, terminal or axillary; rachis tomentose, to 25 cm long; calyx 4-lobed, campanulate; standard to 10 mm across, reddish, orbicular, retuse at apex. Joints of pod 2 or 3, to 1.5 x 0.6 cm, falcate, densely covered with hooked hairs.

Flowering & Fruiting: December - April.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, c 54 (Cairn Hills); PSU & NKK, Kodanad, 02.09.1994, 160 & 14.11.1994, 329 (TNFDH).

DUMASIA A. P. de Cand.

242. Dumasia villosa DC., Ann. Sci. Nat. (Pairs) 4: 96. 1825 & Prodr. 2: 241. 1825; Hook. f., Fl. Brit. India 2: 183. 1876; Gamble, Fl. Pres. Madras 351(247). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 316.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 108.1983; Sanjappa, Legumes Ind. 167. 1992. **(PLATE 26: 224)**

Common names: Pullooran-charadu-kodi (M).

Distribution: Indo-Malesia, China and Africa. *Habitat*: Shola border.

Twining herbs; stem retrorsely hispid. Leaves 3-foliolate; leaflets to 7 x 5 cm, rhomboid, acute or obtuse, adpressed-hairy, stipellate; petiole to 7 cm long; stipule 7 mm long, lanceolate. Racemes axillary, to 5 cm long; bracts and bracteoles subulate. Flowers many, yellow; calyx 12 mm long, tubular, black, glabrous; corolla yellow; standard erect, 20 mm long, obovate, clawed; wings 15 mm long, obovate, long-

clawed; keel brown at apex; stamens 9+1; anthers uniform; ovary villous, many-ovuled. Pods 4 x 0.6 cm, oblong, sub-terete, acute, stalked, glabrous; seeds 3-5, 3 x 2 mm, black.

Flowering & Fruiting: August - December.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

PSU & NKK, Kodanad, 21.11.1995, 369 (TNFDH).

FLEMINGIA Roxb. ex Ait.

1. Trailing herbs, flowers in terminal heads .... ***F. nilgheriensis***
1. Spreading subshrubs; flowers in spicate racemes 2

2. Leaflets thick, pubescent beneath .... ***F. grahamiana***
2. Leaflets thin, glabrous, except on the nerves beneath .... ***F. macrophylla***

243. Flemingia grahamiana Wight & Arn., Prodr. 242. 1834; Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Pres. Madras 378(267). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 318.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 109.1983; Sanjappa, Legumes Ind. 175. 1992. **(PLATE 26: 225)**

Distribution: India and Tropical Africa. *Habitat*: Shola border.

Shrubs, stem scabrous. Leaflets 10 x 5 cm, obovate, obtusely acute, grey-tomentose beneath; nerves to 8 pairs, very prominent beneath, impressed above, reticulate; petiole 5-6 cm long, triquetrous. Racemes 3-5 cm long, 1-3 together, densely yellowish brown hairy; bracts 3 x 2 mm, ovate. Flowers densely arranged, shortly pedicelled; calyx 8 mm long, densely red-glandular, lobes lanceolate; standard 9 x 6 mm, obovate, acute; wings 8 x 1.5 mm, linear-oblong; ovary densely hairy.

Flowering & Fruiting: November - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 21.11.1995, 367 (TNFDH).

244. Flemingia macrophylla (Willd.) Prain ex Merr., Philipp. J. Sci. 5: 130. 1910; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 109.1983; Sanjappa, Legumes Ind. 176. 1992. *Crotalaria macrophylla* Willd., Sp. Pl. 3: 982. 1802. *Flemingia congesta* Roxb. ex Ait.f., Hort. Kew (ed. 2) 4: 349. 1812; Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Pres. Madras 378(267). 1918. *Moghania*

macrophylla (Willd.) O. Ktze., Rev. Gen. Pl. 1: 199. 1891. *Flemingia semialata* Roxb., Fl. Ind. 3: 340. 1832; Gamble, Fl. Pres. Madras 378(267). 1918; Sanjappa, Legumes Ind. 178. 1992. *Flemingia congesta* Roxb. ex Ait.f. var. *semialata* (Roxb.) Baker in Hook.f., Fl. Brit. India 2: 229. 1876, p.p. *Moghania prostrata* (Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6: 19. 1953. **(PLATE 26: 226)**

Common names: Aski (K); Kamatteri, Korkattachedi (M).

Distribution: Paleotropics. *Habitat*: Shola border.

Erect shrubs; branchlets trigonous, adpressed tomentose. Leaflets subequal, 5-14 x 2-5 cm, elliptic-lanceolate, base cuneate to rounded, apex acute to acuminate, tomentose along the nerves on both surfaces or glabrescent above, basally 3-nerved; petiole to 7 cm long, narrowly winged. Racemes axillary, clustered or single, 2.5-5.5 cm long, villous. Flowers 7-10 mm long; pedicels ca 2 mm long; bracts 4-7 mm long, lanceolate. Calyx lobes linear-lanceolate, the lower longest, much exceeding the tube, pubescent. Petals reddish; standard 7-8 mm long, oblong-obovate; wings and keels long-clawed. Pods 0.8-1.2 x 0.4-0.6 cm, oblong, turgid, covered with powdery red coating.

Flowering & Fruiting: November - January.

Utility: Used in Ayurveda and Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

245. Flemingia nilgheriensis (Baker) Wight ex Cooke, Fl. Pres. Bombay 1: 393. 1902, "nilgiriensis"; Gamble, Fl. Pres. Madras 379(267). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 319.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 109.1983; Sanjappa, Legumes Ind. 177. 1992. *Flemingia vestita* Benth. ex Baker var. *nilgheriensis* Baker in Hook.f., Fl. Brit. India 2: 230. 1876. *Flemingia procumbens* Wight, Ic. t. 987. 1845, non Roxb., 1832. **(PLATE 26: 227)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Spreading herbs; branchlets several, to 30 cm, terete, covered with long spreading hairs with yellow glands. Leaves 3-foliolate, densely pilose and yellow gland-dotted below; petiole to 1 cm; leaflets subsessile, to 2 x 1.5 cm; mid-leaflet obovate, laterals rhomboid, apex rounded, mucronate; stipules lanceolate, to 7 x 2 mm, densely pilose above. Inflorescence terminal, globose, 2 cm wide; stalk to 3 cm; bracts foliaceous,

caducous. Calyx densely hairy, hairs bulbous below; lobes twice as long as tube, narrow-lanceolate, to1 cm. Corolla purple; standard obovate, to 7 x 6 mm, hairy and glandular without; wings 5 x 2 mm, clawed; keels 4 x 2 mm, clawed. Pod ovoid, 5 mm wide, enclosed in calyx; seed 1, ellipsoid.

Flowering & Fruiting: November - February.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Ankinda.

INDIGOFERA L.

1. Leaves 3-foliolate, racemes slender .... *I. pedicellata*
1. Leaves pinnate; leaflets 15, racemes pendulous .... *I. cassioides*

246. Indigofera cassioides Rottl. ex. DC., Prodr. 2: 225. 1825; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 111.1983; Sanjappa, Legumes Ind. 186. 1992 & in Hajra et. al., Fasc. Fl. Ind. 21:29. 1995. *Indigofera pulchella* Roxb., Fl. Ind. 3: 382. 1832; Hook. f., Fl. Brit. India 2: 101. 1876; Gamble, Fl. Pres. Madras 313(221). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 312.1920. **(PLATE 26: 228)**

Common names: Kaadu togari, Gogge (K); Manneli, Manali (M); Nariinci, Narina (T).

Distribution: Pakistan, India to Indo-China. *Habitat*: Shola border.

Erect shrubs, to 1.5 m tall. Leaves to 13 cm long; leaflets to 10 pairs, to 2 x 1 cm, obovate, emarginate, cuspidate; stipule lanceolate. Racemes 5-15 cm long, axillary, many-flowered; bracts lanceolate, subulate above. Flowers 13 mm long, pink; calyx 3.5 mm long, lobes acuminate, hairy; standard 10 x 7 mm, obovate, glabrous; wings 11 mm long, oblanceolate; keel ciliate at apex. Pods 30 x 5 mm, oblong, compressed, glabrous, cuspidate, many-seeded.

Flowering & Fruiting: July - January.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

PSU & NKK, Kodanad, 20.07.1994, 391& 10.10.1994, 217 (TNFDH).

247. Indigofera pedicellata Wight & Arn., Prodr. 200. 1834; Gamble, Fl. Pres. Madras 311(218). 1918; Fyson, Fl. South Indian Hill St. 2: t. 84. 1932; Vajr. in

N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 113.1983; Sanjappa, Legumes Ind. 194. 1992 & in Hajra et. al., Fasc. Fl. Ind. 21: 113. 1995. **(PLATE 26: 229)**

Distribution: India and Taiwan. *Habitat*: Shola border.

Prostrate herbs; branches several, radiating and ascending from a stout rootstock; branchlets adpressed-pubescent. Leaves 3-foliolate, 2 x 2.5 cm, chartaceous, gland-dotted and adpressed- pubescent below; petiole 0.5 cm; leaflets oblong-oblanceolate, to1.5 x 0.8 cm, base cuneate, apex obtuse, apiculate, subsessile; stipules scarious. Racemes axillary, slender, subcorymbose, to 12-flowered, to 2.5 cm long; peduncle 4 mm; pedicels 2 mm; bracteole 1 mm. Calyx-tube campanulate; lobes subequal, setaceous. Corolla red; standard obovate, 5 x 2 mm, pubescent without; wings oblong; keels erect. Stamens 9+1. Ovary sessile. Pod straight, to 2 cm; stalk 0.5 cm; seeds ca 6.

Flowering & Fruiting: July - November.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

KNS, Glenmorghan, 11.05.1963, 537 (FRC).

PAROCHETUS Buch.-Ham. ex D. Don

248. Parochetus communis Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 240. 1825; Hook. f., Fl. Brit. India 2: 86. 1876; Gamble, Fl. Pres. Madras 303(214). 1918; Fyson, Fl. South Indian Hill St. 2: t. 83.1932; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 117.1983; Sanjappa, Legumes Ind. 227. 1992. **(PLATE 26: 230)**

Common names: Blue Oxalis (E).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Trailing herbs, rooting at nodes. Leaves digitately 3-foliolate; leaflets to 15 x 20 mm, obcordate, pubescent below; petiole 3-4 cm long, erect; stipule ovate. Flowers solitary or 2-3-together, on axillary erect peduncles; bracts and bracteoles similar, ovate; calyx 6 mm long, 5-lobed; upper two lobes connate; standard 13 x 13 mm, obovate, blue; wings 10 mm long, obovate, long-spurred at base; keel not spurred; stamens 9 + 1; ovary glabrous, many-ovuled. Pods 2 x 0.5 cm, oblong; seeds many, globose.

Flowering & Fruiting: December - March.

Utility: Used in Folk medicine.

Notes: Found in the moist areas, shola floor ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, c 66 (Cairn Hills).

SHUTERIA Wight

249. Shuteria involucrata (Wall.) Wight & Arn., Prodr. 207. 1834; Antony, Syst. Stud. Fl. Kottayam Dist. 137. 1989; Sanjappa, Legumes Ind. 245. 1992. *Glycine involucrata* Wall., Pl. Asiat. Rar. 3: 22. t. 241. 1832. *Glycine involucrata* Wall. var. *glabrata* (Wight & Arn.) Ohashi, J. Jap. Bot. 50: 305. 1975. *Shuteria glabrata* Wight & Arn., Prodr. 207. 1834. *Shuteria vestita* Wight & Arn., Prodr. 207. 1834; Hook. f., Fl. Brit. India 2: 181. 1876; Gamble, Fl. Pres. Madras 350(247). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 315.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 121.1983; Sanjappa, Legumes Ind. 245. 1992. **(PLATE 27: 231)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Slender twiners, stem villous. Leaves 3-foliolate, leaflets unequal, 3-4.5 x 2-2.5 cm, ovate, apex obtuse, base rounded, chartaceous, villous; petiole to 6 cm long, stipules lanceolate, striate with a tuft of hairs at base. Racemes to 20 cm long, axillary; bracts and bracteoles similar. Flowers many, white, deflexed. Calyx 4 mm long, lobes acuminate. Petals white, standard 7 x 5 mm, orbicular, wings 8 m long, spurred at base, keel 8 x 3 mm, oblong. Stamens 9 + 1. Ovary many-ovuled, densely hairy. Pods to 4 x 0.5 cm, oblong, flat, densely hispid; seeds many, cubical.

Flowering & Fruiting: November - February.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 14.11.1994, 420, 491 (TNFDH).

SMITHIA Ait.

250. Smithia blanda Wall. ex Wight & Arn., Prodr. 221. 1834; Hook. f., Fl. Brit. India 2: 151. 1876; Gamble, Fl. Pres. Madras 330 (233). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 121.1983; Sanjappa, Legumes Ind. 246. 1992. **(PLATE 27: 232)**

Distribution: India. *Habitat*: Marshy areas in Grasslands.

Tall, much branched sub-shrubs, lower stem prostrate; stem, petioles, rachis, leaf margins and midrib below long-bristly. Leaflets 4-5 pairs, 1-2 x 0.5-0.8 cm, elliptic

lanceolate, obtuse at apex with mucronate tip, ciliate on margins; rachis ending in a subulate bristle. Racemes corymbose, axillary and terminal; bracts lanceolate, 0.5-0.7 cm. Calyx 0.5 cm long, 2-lipped, upper large, emarginate, lower 3-lobed, ciliate on margins. Petals yellow, 1-1.3 cm long, wing petal with transverse scaly foldings. Pods 4-5 jointed folded and enclosed in the accrescent calyx.

Flowering & Fruiting: October - January.

Notes: Found in the moist areas of sholas ± 2050 m, common in Pykara falls.

SOPHORA L.

251. Sophora velutina Lindl., Bot. Reg. 14. t.1185. 1828; Sanjappa, Legumes Ind. 250. 1992. *Sophora glauca* Lesch. ex DC., Ann. Sci. Nat. (Paris) 4: 98. 1825 & Prodr. 2: 95. 1825; Hook. f., Fl. Brit. India 2: 249. 1878; Gamble, Fl. Pres. Madras 389 (274). 1918; Fyson, Fl. South Indian Hill St. 2: t. 90. 1932; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 122.1983, non Salisb. *Edwardsia maderaspatana* Wight, Ic. t. 1054. 1846. **(PLATE 27: 233)**

Distribution: India, Nepal and West China. *Habitat*: Shola border.

Shrubs, ca 2 m high; young branches, rachis and leaves densely velutinous. Leaves 15-20 cm; leaflets 13-41, opposite or nearly opposite, 1-4 × 0.5-2 cm, ovate-lanceolate, elliptic, elliptic-lanceolate, oblong, or ovate-oblong, papery, hairy on both surfaces, glabrous, or glabrous adaxially, midvein raised, base rounded or obtuse, apex acuminate or acute; stipules linear, 6-7 mm, villous; Racemes opposite with leaf or pseudo-opposite, 15-20(-30) cm. Flowers many, widely spaced; bracts similar to stipule, 6-8 mm, hairy; pedicel short, 2-3 mm. Calyx campanulate, ca. 13 mm; teeth 5, unequal, dark brown hairy. Standard petal reflexed, obovate-lanceolate or obovate-oblong, ca 16 × 3-5 mm, apex retuse, narrowing to base; wings oblong, less than 15 mm, base auriculate; keel falcate, slightly shorter than wings. Stamens 10, free or slightly fused at base. Ovary terete, densely yellow pubescent, stalked; ovules 4-6; style straight, glabrous; stigma capitate, very small. Fruit moniliform, slightly compressed, 6-10 × 0.7-1 cm, hairy or nearly glabrous; seeds 2-4, yellow or yellow-brown, oblong-reniform, ends acute to rounded.

Flowering & Fruiting: March - February.

Notes: Found in the grassy slopes ± 1800 m, common in Thaishola.

PSU & NKK, Kodanad, 11.03.1994, 11 & 14.11.1994, 223 (TNFDH).

1. Flowers 1 cm long, white .... *T. repens*
1. Flowers 0.5 cm long, yellow .... *T. dubium*

252. Trifolium dubium Sibth, Fl. Oxon 231. 1794; Gamble, Fl. Pres. Madras 302 (214). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 124.1983. *T. minus* Smith. in Relham. Fl. Cent. ed. 2: 270. 1802; Baker in Hook.f., Fl. Brit. India 2: 86. 1876. **(PLATE 27: 234)**

Distribution: Native of Europe; now naturalised in Tropical Asia. *Habitat*: Grasslands.

Prostrate herbs; branches slender, ascending. Leaves pinnately 3- foliolate, 1x 1.5 cm; pedicel to 2 cm, filiform; stipules oblique, ovate-acuminate, to 6 mm, ciliate; leaflets obovate, to 1 x 0.6 cm, base cuneate, margin denticulate, apex emarginated; petiolule of terminal leaflet 3 mm. lnfloescence axillary, globose, 8 mm wide; peduncles longer than petioles; bracts deltoid. Flowers 0.4 cm long, yellow. Calyx glabrous, 2 mm; upper teeth longer than tube, lower ones shorter. Corolla yellow, clawed: standard obovate, 4 x 2.5 mm; wings (with claw) 6 mm; keels 3.5 mm . Pods oblong, 3 x 1.5 mm; seed 1, ovoid.

Flowering & Fruiting: April - May.

Notes: Weed of courtyard ± 2050 m, common in Pykara.

253. Trifolium repens L., Sp. Pl. 767. 1753; Hook. f., Fl. Brit. India 2: 86. 1876; Gamble, Fl. Pres. Madras 302 (214). 1918; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 124.1983. **(PLATE 27: 235)**

Common names: White clover, Dutch clover (E).

Distribution: Native of Europe. *Habitat*: Grasslands.

Perennial herbs, stoloniferous, glabrescent; stems 10-30 cm, prostrate, rooting at nodes. Leaves long petiolate, palmately 3-foliolate; stipules ovate-lanceolate, membranous, with veins green or red, sheathing at base, apex subulate; petiolule 1-1.5 mm; leaflets obovate to ovate, 6-20 (-40) × 8-16 (-25) mm, lateral veins 13 pairs, prominent on both surfaces, base cuneate, apex emarginate to broadly rounded. Flowers 20-50(-80), in terminal, globose umbels, 1.5-4 cm; peduncle equal to or longer than petiole; involucre absent; bracts lanceolate-ovate, membranous; pedicels 2-5 mm, reflexed after anthesis. Calyx 3-5 mm, veins 6-10; teeth shorter than tube. Corolla white, rarely

pink-tinged, 5-12 mm, fragrant; standard elliptic, longer than wings and keel. Ovary sessile; ovules 3 or 4. Legume linear-oblong; seeds 2-4, ovoid to reniform.

Flowering & Fruiting: May - October.

Utility: Used in Homeopathy medicine.

Notes: Weed of courtyard ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 06.04.1994, c 75 (Cairn Hills).

ULEX L.

254. Ulex europeaus L., Sp. Pl. 741. 1753; Gamble, Fl. Pres. Madras 301(213). 1918; Fyson, Fl. South Indian Hill St. 2: t. 72. 1932; C.P. Malathi. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 124.1983. **(PLATE 27: 236)**

Common names: Panni mullu (T).

Distribution: Europe. *Habitat*: Naturalised in Road sides and grasslands.

Densely branched, compact shrubs; branchlets striate, green, hirsute to tomentose, with red-brown hairs; numerous spines on short branchlets on the main branches; primary spines furrowed to 5 cm; laterals to 1.5 cm. Leaves (3 foliate in seedlings) represented by green terete, pointed petioles to 1 cm. Flowers one or a few, axillary, 1.5 cm often crowed in terminal clusters; pedice 1 8 mm, white pubescent bracts conical; bract conical; bracteoles boat shaped, 4 x2 mm pubescent. Calyx deeply 2 lobed, yellowish, subequal, boat shaped; adaxial shorter but broader, 2-andered obovate, 2 x 1.5 cm toothed, 1.5 x 0.8 cm; abaxial 3 toothed, 1.7 x 0.6 cm. Corolla yellow, clawed: andered obovate, 2 x 1.5 cm, with adeep apical notch; wings obtuse, 2 x 0.6 cm; keels obtuse, 1.5 x 0.5 cm baslly pouched, white adpressed pubscent along the line of cohesion. Stamens 10, monodelphous, sheeth 6 mm; filaments alternately shorther and longer. Ovary densely adpressed white-pubescent; style 1 curved apically; ovules ca 4. Pod oblong, 15 x 0.6 cm, densely pubescent; seeds 2-4, each 4 x 3mm.

Flowering & Fruiting: March- August.

Notes: Naturalised in grasslands ± 2000 m, common in Thalakuntha.

PSU & NKK, Pykara, 26.01.1991, c 76 (Cairn Hills); KNS, Dodabetta, 11.05.1963, 549 (FRC).

39. FLACOURTIACEAE

1. Petals with inner scales; fruits hard rinded globose berry, more than 4 cm in diameter .... ***Hydnocarpus***
1. Petals without inner scales; fruits capsule or fleshy berry, less than 2 cm diameter .... ***Scolopia***

HYDNOCARPUS Gaertn.

255. Hydnocarpus alpina Wight, Ic. t. 942. 1845; Hook. f., Fl. Brit. India 1: 197. 1872; Gamble, Fl. Pres. Madras 52(37). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 288.1920; S.R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 18.1983; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 418. 1993. *Hydnocarpus pendula* Manilal et al., Trop. Plant. Sci. Res. 1: 35. 1983. **(PLATE 27: 237, 237 a & b)**

Common names: Attuchankala, Kattumarotti, Malamarotti, Malamaravetti, Pinervetty, Vilamaram (M); Attuchankalai, Koranguthalai, Maravetti (T).

Distribution: South India and Sri Lanka. *Habitat:* Shola border.

Trees to 15 m; bark 5-6 mm thick, smooth, greyish-brown, slightly rough; branchlets puberulus. Young leaves copper red. Leaves simple, alternate, drooping; stipules lateral, deciduous; petiole 5-10 mm, stout, swollen tipped, grooved above and glabrous; lamina 8-25 x 5-10 cm, ovate, elliptic-oblong or ovate-lanceolate, base oblique, round or acute, apex acute or acuminate, margin entire, glabrous, glossy, coriaceous, lateral nerves 7-10 pairs, pinnate, slender, prominent, intercostae reticulate. Flowers unisexual 22-25 mm across, yellowish-white, solitary or in stout axillary fascicles; pedicel 1.5-2 cm long, deflexed, pubescent; sepals 5, 8 mm long, oblong, pubescent, imbricate; petals 5, 1 cm long, narrow, glabrous, with a scale at the base; scales linear, as long as petals, sparsely hairy; stamens 5-15; filaments glabrous; connectives broad; ovary 1-celled, tomentose, stigmas 5, free, radiating, recurved. Fruit a berry, 5-7 cm across, densely tomentose, dark brown.

Flowering & Fruiting: February - July.

Utility: Used in Folk medicine. Seeds are used for leprosy, skin diseases, leucoderma, pruritus, eczema, dermatitis, phthisis, tubercular laryngitis, chronic ulcers, dyspepsia, flatulence and verminosis.

Propagation: The seeds have viability of about three months. The whole fruit is broken and seeds are separated and dried in sunlight. Usually no pretreatment is required.

The dried seeds can be soaked in water before sowing into mother bed. Germination is of about 25%.

Notes: Not a typical shola species; seen along the edges of shola and evergreen forests ± 1400 m, common in Dolpin nose. The Red listed status of this species is Vulnerable for Karnataka, Kerala and Tamilnadu.

SCOLOPIA Schreb. *nom. cons.*

256. Scolopia crenata (Wight & Arn.) Clos, Ann. Sci. Nat. Bot. ser. 4, 8: 250. 1857; Hook. f., Fl. Brit. India 1: 191. 1872; Gamble, Fl. Pres. Madras 52(38). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 287.1920; Sleumer, Blumea 20: 39. 1972; S.R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 19.1983; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 430. 1993. *Phoberos crenatus* Wight & Arn., Prodr. 29. 1834. **(PLATE 28: 238)**

Common names: Chiralu, Kakkadae, Kodalimara (K); Charalu, Cherakanji, Kakkamaram, Mullaramaram, Mullukara, Saralamaram (M); Charalu, Kodalimaram, Sekkada, Terunai (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Evergreen trees, armed with thorns, spines often branched; branchlets with transverse lenticels. Leaves simple, alternate, estipulate; petiole 8-15 mm, slender, glabrous; lamina 5-14 x 2.5-6 cm, lanceolate, elliptic-lanceolate, ovate or obovate, base rounded or acute, apex abruptly acuminate, caudate-acuminate or acute margin crenate or serrate, glabrous, coriaceous, 3-5-ribbed from the base, lateral nerves 3-8 pairs, pinnate, faint, intercostae reticulate, faint. Flowers bisexual, 1.5 cm across, white, in axillary racemes of 5-7 cm long; rachis ferrugineous tomentose; pedicel 6 mm long, puberulus. Sepals 4-6, 3 x 2 cm, ovate, ciliate. Petals 4-6, 1.5 mm long, oblong, glabrous; stamens numerous, free; anthers 1 mm long; connective produced into a reddish hood; disc extra-staminal, glandular pubescent; ovary one celled, few ovuled; style 4 mm long, thick, grooved; stigma 3-fid. Fruit a berry, globose, 10 x 8 mm across, with persistent style; seeds few.

Flowering & Fruiting: October - April.

Utility: Timber is used for planks, but it is difficult to saw. Fruit is edible. Seeds yields and aromatic oil.

Notes: Not a typical shola species; seen along the edges of shola and evergreen forests ± 1400 m, common in Lambs rock.

KNS, 12th Hairpin bend, Nilgiris, 24.02.1977, 6658 (FRC).

40. GENTIANACEAE

1. Ovary 2-celled; stamens excerted .... ***Exacum***
1. Ovary 1-celled; stamens included **2**

2. Corolla-lobes ornamented within **3**
2. Corolla-lobes without ornamentation .... ***Gentiana***

3. Corolla with glandular nectarines at base .... ***Swertia***
3. Corolla with pits prolonged into a spur .... ***Halenia***

EXACUM L.

1. Corolla-lobes large, to 2.5 cm .... ***E. tetragonum***
1. Corolla-lobes small, to 1 cm long .... ***E. wightianum***

257. Exacum tetragonum Roxb., Fl. Ind. 1: 413. 1820; Hook. f., Fl. Brit. India 4: 95. 1883; Gamble, Fl. Pres. Madras 873 (613). 1923; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 94.1987. *Exacum bicolor* Roxb., Fl. Ind. 1: 413.1820; Hook. f., Fl. Brit. India 4: 96. 1883; Gamble, Fl. Pres. Madras 873 (613). 1923. *Exacum perrottetii* Griseb. in DC., Prodr. 9: 45. 1845. **(PLATE 28: 239)**

Common names: Bicolor Persian Violet (E); Kannamthali (M).

Distribution: Peninsular India. *Habitat*: Grasslands.

Tall herbs, to 120 cm high; stems quadrangular, narrowly winged or not. Leaves to 7 x 1.5 cm, elliptic, narrowed to a broad petiole, acute at apex, 3-ribbed. Cymes terminal, corymbose; bracts 7 mm long, linear. Flowers many; calyx 9 mm long, wings 2 mm broad, lobes acuminate; corolla blue, tube short, lobes 20 x 8 mm, elliptic, acute; anthers 8 mm long, eglandular, filaments broaden at base.

Flowering & Fruiting: November - January.

Utility: Used in Folk, Siddha and Unani medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Ankinda.

258. Exacum wightianum Arn., Ann. Sci. Nat Bot. ser. 2, 1: 176. 1839; Hook. f., Fl. Brit. India 4: 97. 1883; Gamble, Fl. Pres. Madras 873(614). 1923; Fyson, Fl. South Indian Hill St. 1: 289. 1932; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 95.1987. *Exacum atropurpureum* Bedd. var. *palghatense* Gamble, Fl. Pres. Madras 874 (614). 1923. **(PLATE 28: 240)**

Common names: Persian Violet (E); Thavalakkalchedi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Undershrubs. Stem 4-winged. Leaves opposite, 6 x 4 cm, broadly ovate, lanceolate, acuminate, membranous, 5-nerved, sessile. Cymes axillary and terminal; calyx lobes winged, 12 mm, lanceolate, wings to 4 mm broad; corolla rotate, tube 6 mm, lobes 2 cm, oblanceolate, apiculate; stamens 5, filaments 4 mm; ovary many ovuled; style 8 mm; stigma sub capitate.

Flowering & Fruiting: April - July.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

PSU & NKK, Kodanad, 10.06.1995, 252 (TNFDH); KNS, Curzon valley, 22.04.1964, 1245 (FRC).

GENTIANA L.

1. Basal rosette of leaves much larger than stem leaves; capsule stalk not longer than calyx-lobes .... ***Gentiana pedicellata*** var. ***wightii***
1. Basal rosette of leaves much smaller than stem leaves; capsule stalk longer than calyx- lobes .... ***Gentiana quadrifaria*** var. ***zeylanica***

259. Gentiana pedicellata Wall. ex Griseb., Gen. Sp. Gent. 274. 1839, var. **wightii** Kusnezov in Trudy, Imp. S.-Peterburgsk Bot. Sada 15: 401. 1895; Gamble, Fl. Pres. Madras 876 (616). 1923; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 95.1987. **(PLATE 28: 241)**

Distribution: Indo-Malesia and China. *Habitat*: Grasslands.

Small erect herbs, 10-15 cm high, usually smaller, profusely branched towards top; whole plant violetish. Leaves small, 0.8-1.2 x 0.4-0.7 cm, lower larger, becoming very small towards tip, ovate, obtuse at apex, attenuate at base; petioles winged. Flowers solitary, axillary or terminal; flowering branches with very small leaves, the opposite pairs joined at base to form a cup surrounding the node. Calyx campanulate;

tube 0.3-0.4 cm long; lobes 5, 0.2 cm long, linear lanceolate and acuminate. Corolla blue, campanulate, 0.7-0.8 cm long, widened at top; lobes 5, with folds in between lobes. Stamens 5, included. Ovary oblong, 0.25-0.3 cm long, stalked; stalk ca 0.2 cm long; ovules many; stigma 2-lobed. Capsule 0.8-1 cm long, splitting to 2 valves; calyx and corolla persistent in fruits.

Flowering & Fruiting: April - June.

Notes: Found in grasslands ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 22.06.1995, 74 (TNFDH); KNS, Glenmorghan, 11.05.1963, 538 (FRC).

260. Gentiana quadrifaria Blume var. **zeylanica** (Griseb.) Kusnezov, Trudy Imp. S. Peterburgsk. Bot. Sada 15: 403. 1895; Gamble, Fl. Pres. Madras 876 (616). 1923; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 95.1987. *Gentiana zeylanica* Griseb., Gen. Sp. Gent. 274. 1839. *Gentiana pedicellata* sensu Gamble, Fl. Pres. Madras 876 (616). 1923, non Wall. ex Griseb. 1839. *Gentiana quadrifaria* sensu Clarke in Hook. f., Fl. Brit. India 4: 111(616). 1883, non Blume, 1826; Fyson, Fl. South Indian Hill St. 2: t. 156. 1932. **(PLATE 28: 242)**

Distribution: India, Sri Lanka, Myanmar, Java and China. *Habitat*: Grasslands.

Tufted herbs; stem 4-angular, angles narrowly winged. Leaves ovate, to 4 x 3 mm, estipulate, sessile, chartaceous, glabrous, 3-ribbed, mid-vein thickened, connate at base, base rounded, apex acute, mucronate, basal(rosette) leaves smaller than stem leaves. Cymes to 2 cm; bracts to 0.7 mm; peduncle to 1.5 cm. Flower(s) 1-3. Calyx-lobes 5, triangular, glabrous, keeled, mucronate, valvate. Corolla blue, 3.5 mm wide; tube 1.2 cm; lobes 5, suborbicular, to 2 x 2 mm, twisted, with folds in between. Stamens 5; filaments elliptically dilated in the middle. Ovary 1-celled; ovules many; stigma 2-fid, curved. Capsule oblong-truncate, to 4.5 x 2.5 mm, surmounted by persistent calyx-lobes; stalk longer than calyx-lobe; seeds numerous, ellipsoid-trigonous.

Flowering & Fruiting: September - November.

Notes: Found in the marshy areas ± 2100 m, common in Ankinda.

PSU & NKK, Glenmorgan, 26.01.1991, b 73 (Cairn Hills).

HALENIA Borkh

261. Halenia perrottetii Griseb. in DC. Prodr. 9: 129. 1845; Wight, Ic. t. 1334. 1848; Hook.f., Fl. Brit. India 4: 130. 1883; Gamble, Fl. Pres. Madras 881(620). 1923; Fyson, Fl. South Indian Hill St. 3: t. 431. 1920; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 95.1987. **(PLATE 28: 243)**

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Erect herbs. Leaves ovate-lanceolate to broadly elliptic, to 3 x 1 cm, basal leaves obovate-oblong, 3 x 2 cm , estipulate, chartaceous, glabrous, ribbed, base acute-cuneate, less often obtuse, apex acute to obtuse, petiole to 1 cm. Panicle of leafy cymes to 5 cm, mostly terminal; peduncle to 6 cm flowers to 3(5). Calyx lobes 4, oblanceolate, 4 mm, apiculate, imbricate, glabrous, ribbed. Corolla campanulate; white, tinged pinkish, 1.2 cm wide; lobes 4, oblong, 9 x 4 mm, twisted, pitted about one third above base, and extending outwards as a spur between calyx-lobes; spur tubular, ascending, to 3 mm. stamens 4, attached near corolla-base. Ovary 1 celled; ovules numerous, on parietal placentae; stigma 2 fid. Capsule terete, to 1 cm.

Flowering & Fruiting: August - October.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Pykara.

PSU & NKK, Naduvattam, 11.02.1991, b 74 (Cairn Hills).

SWERTIA L.

1.	Small herbs; corolline nectarines 2 on lateral veins	***S. minor***
1.	Herbs; corolline nectary1 on mid vein	**2**
2.	Inflorescence corymbose	**3**
2.	Inflorescence paniculate	***S. angustifolia var. pulchella***
3.	Leaves deltoid to ovate; corolla lobes obovate	***S. lawii***
3.	Leaves linear-oblong; corolla lobes elliptic-obovate	***S. corymbosa***

262. Swertia angustifolia Buch.-Ham. var. **pulchella** (Buch.-Ham. ex Clarke) Burkill, J. Asiat. Soc. Bengal 2:375.1906; Gamble, Fl. Pres. Madras 880 (619). 1923; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 95.1987. *Swertia pulchella* Buch.-Ham. ex Clarke in Hook.f., Fl. Brit. India 4: 125. 1883. **(PLATE 28: 244)**

Common names: Chiratha (M).

Distribution: South Asia. *Habitat*: Grasslands.

Branched herbs; stem 4-angled, angles narrowly winged. Leaves lanceolate, 4 x 1.5 cm, estipulate, sessile, chartaceous, glabrous, 3-ribbed, base acute-cuneate, apex acutely acuminate. Panicles to 6 cm, axillary, also terminal; peduncles to 7 cm. Calyx-lobes 4, lanceolate, 5 mm, imbricate. Corolla white with blue or violetish spots distally on the lobes; tube 1.5 mm; lobes 4, broadly elliptic, obtuse, 9 x 4 mm, twisted; nectary basal, fimbriate at mouth and covered by a ciliate scale; glands orbicular, 1 mm wide. Stamens 4. Ovary 1-celled; ovules numerous, on parietal placentae; stigma 2-lobed.

Flowering & Fruiting: October - May.

Utility: Used in Ayurveda and Unani medicine.

Notes: Found in the exposed slopes of sholas and grasslands ± 2100 m, common in Ankinda.

263. Swertia corymbosa (Griseb.) Wight ex Clarke in Hook.f., Fl. Brit. India 4: 126. 1883; Gamble, Fl. Pres. Madras 881(619). 1923; Fyson, Fl. South Indian Hill St. 2: t. 194. 1932; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 96.1987. *Ophelia corymbosa* Griseb., Gen. Sp. Gent. 317. 1839. **(PLATE 28: 245)**

Common names: Avalpoovu (M).

Distribution Peninsular India. *Habitat*: Grasslands.

Stout erect herbs; 30-40 cm high; stem 4-angled, profusely branched. Leaves to 3 x 2 cm, ovate, acute, subamplexicaule at base, 3-ribbed. Cymes terminal, corymbose. Flowers densely packed; bracts 1 cm long, lanceolate; pedicel 13 mm long; calyx lobes 11 x 1.5 mm, lanceolate, free; corolla white with bluish spots, 12 x 4 mm; lobes 4, connate at base only; nectary chamber at the base of corolla, covered with an orbicular lid, rim of the chamber with scabrous bristle; stamens 4, all fertile; ovary ovoid; style short; stigma capitate. Capsule 2-valved; seeds many, reticulate.

Flowering & Fruiting: October - December.

Utility: Used in Ayurveda and Folk medicine.

Notes: Found in the exposed slopes of sholas and grasslands ± 2000 m, common in Pykara. The Red listed status of this species is Vulnerable for Karnataka Kerala and Tamil Nadu.

PSU & NKK, Naduvattam, 26.01.1991, b 76 (Cairn Hills).

264. Swertia lawii (Wight ex Clarke) Burkill, J. Asiat. Soc. Bengal 2: 379. 1906; Gamble, Fl. Pres. Madras 881 (619). 1923. *Swertia corymbosa* Wight var. *lawii* Wight ex Clarke in Hook.f., Fl. Brit. India 4:126.1883. **(PLATE 28: 246)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Erect herbs, to 60 cm tall. Leaves simple, opposite, deltoid-ovate, up to 3.5 x 1.3 cm, lanceolate, acuminate, rounded-truncate at base, 3-nerved. Flowers in terminal lax cymes, ca 3.5 cm long, cymules at the ends of the inflorescence branches lax. Calyx deeply 4 or 5 partite, tube 0 or very short; lobes narrowly lanceolate. Corolla white with blue nerves, rotate; lobes 4 or 5, obovate, mucronate; nectary 1 near the base of each corolla-lobe, large, ciliate, covered with a fimbriate scale. Stamens 4 or 5, inserted at the base of the corolla, free or slightly jointed in a ring; filaments linear, often dilated downwards; anthers oblong, versatile. Ovary 1-celled, the placentas slightly intruded; ovules many; style short or 0; stigma bilobed. Fruit a sessile, ovate or oblong, 2-valved capsule; seeds usually many, small, testa reticulate.

Flowering & Fruiting: November - January.

Utility: Used in Ayurveda and Unani medicine.

Notes: Found in the exposed slopes of sholas and grasslands ± 1800 m, common in Naduvattam. The Red listed status of this species is Endangered for Karnataka Kerala and Tamil Nadu.

265. Swertia minor (Griseb.) Knobl., Bot. Centralbl. 60: 321. 1894; Gamble, Fl. Pres. Madras 880 (619). 1923; K. Ramam. in Henry et al., Fl. Tamil Nadu 2: 96.1987. *Ophelia minor* Griseb. in DC., Prodr. 9: 126. 1845. *Pleurogyne minor* (Griseb.) Benth. in Benth. & Hook.f., Gen. Pl. 2: 816. 1876; Hook. f., Fl. Brit. India 4: 120. 1883. **(PLATE 29: 247)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Wet areas in grasslands.

Low herbs; stem subterete, faintly winged. Leaves ovate, rarely obovate, 0.6-1.8 x 0.3-1.2 cm, estipulate, 3-ribbed, stem-clasping, midrib faintly winged below, base obtuse, apex acute. Cymes to 2 cm, to 3-flowered; peduncles to 1.5 cm. Calyx-lobes 4, elliptic, 5 x 2 mm, glabrous, apiculate. Corolla rose; tube 1 mm; lobes 4, elliptic-oblong, 0.6 x 0.2 cm, twisted; nectaries 2 per lobe, basal, oblong, 3 mm wide. Stamens 4; filaments narrowly winged. Ovary 1-celled; ovules numerous, on parietal placentae; stigma sessile, 2-lobed.

Flowering & Fruiting: August - September.

Utility: Used in Folk medicine.

Notes: Found in the wet exposed slopes of sholas and grasslands ± 2100 m, common in Ankinda.

41. GERANIACEAE

GERANIUM L.

266. Geranium nepalense Sweet, Gerania. 1: t. 12. 1820; Hook. f., Fl. Brit. India 1: 430. 1874; Gamble, Fl. Pres. Madras 131(94). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 294.1920; Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 49.1983; C.L. Malhotra in Hajra et al., Fl. India 4: 75. 1997. *Geranium radicans* DC., Prodr. 1: 639. 1824. *Geranium affine* Wight & Arn., Prodr. 133. 1834, non Ledeb. 1831. *Geranium arnottianum* Steud., Nomencl. Bot. (ed. 2) 1: 677. 1840. **(PLATE 29: 248)**

Distribution: Asia. *Habitat*: Grasslands.

Perennial herbs, diffusely decumbent-ascending, usually several stemmed, hairy or villous with reflexed hairs especially on young parts. Leaves opposite, spreading, 2-6 cm across, 5-angled or deeply 3-5 lobed or partite into strap-shaped segments, sparsely pubescent, 5-fid far beyond middle; median segment rhomboid-obovate, incised at apex; stipules subulate-lanceolate to filiform, 5-7 mm long. Flowers solitary or binate on 2-4 cm long slender peduncles, 1-1.5 cm across, pale purple, pink or mauve with red nerves; bracts 4, thin, 1-4 cm long; pedicels 1-4 cm long, elongating to 6 cm in fruit, sparsely pubescent. Sepals elliptic-lanceolate, short-mucronate at apex, 6-7 x 3-4 mm, pilose outside, persistent. Petals ovate-oblong, entire, ca 5 x 3 mm, pale red-purple. Stamens 10, free or shortly monadelphous; filaments dilated at base, 1.5-2 mm long, puberulous; connectives prolonged into a beak; styles connate at base for more than half, 5-lobed at apex; stigma linear, recurved. Capsules ellipsoid to subglobose, 5-lobed, 3-4 x ca 3 mm, prolonged into a linear-lanceolate 2-2.5 cm long beak; seed 1 in each mericarp, ellipsoid, ca 2 mm long, smooth, shining and black.

Flowering & Fruiting: April - September.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Mukurthi.

KNS, Kotagiri, 12.05.1963, 734 (FRC).

42. GESNERIACEAE

1. Plants epiphytes .... ***Aeschynanthus***
1. Plants terrestrial **2**

2. Leaves radical; fruits linear capsule .... ***Didymocarpus***
2. Leaves cauline; fruits ovoid or ellipsoid capsule or berry **4**

4. Leaves oblique .... ***Rhynchoglossum***
4. Leaves not oblique at base .... ***Epithema***

AESCHYNANTHUS Jack.

267. Aeschynanthus perrottetii A.DC. in DC., Prodr. 9: 261. 1845; Hook. f., Fl. Brit. India 4: 339. 1884; Gamble, Fl. Pres. Madras 985 (692). 1924; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 131.1987. *Aeschynanthus perrottetii* A. DC. var. *planiculmis* Clarke in Hook.f., Fl. Brit. India 4: 340. 1884, 'platyculmis'. *Aeschynanthus planiculmis* (Clarke) Gamble, Fl. Pres. Madras 985 (692). 1924. **(PLATE 29: 249)**

Common names: Malekasoppu, Peepi balli (K).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Epiphytic subshrubs; stems terete, glabrous, scandent. Leaves opposite, to 8 x 1.5 cm, elliptic, succulent, acute, pale below; petiole 5 mm long. Flowers axillary, solitary or rarely paired; pedicels 1 cm long; sepals 8 x 1 mm, free, lanceolate; corolla pink, 4.5 cm long, tubular, curved, widening above, oblique at mouth, lobes 5, subequal, ovate, obtuse, glandular-ciliate; stamens 4, all perfect; filaments 2.5 cm long, free, inserted at the middle of the corolla tube; upper stamens with smaller anthers, confluent in pairs; ovary long-stipitate; linear, 1-celled, ovules many; style slender, stigma terminal. Capsule to 15 cm long, linear; seeds linear, many.

Flowering & Fruiting: November - January.

Notes: Epiphytic on shola trees ± 2100 m, common in Ankinda.

KNS, 19-20 mile from Ooty to Gudalur, 14.05.1963, 666 (FRC).

268. Didymocarpus tomentosa Wight, Ic. t. 1349. 1848; Hook. f., Fl. Brit. India 4: 353. 1884; Gamble, Fl. Pres. Madras 989 (695). 1924; Fyson, Fl. South Indian Hill St. 2: t. 205. 1932; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 133.1987. *Didymocarpus rottleriana* var. *tomentosa* (Wight) Clarke in A. & C. DC., Monogr. Phan. 5: 101. 1883. **(PLATE 29: 250)**

Common names: Elichuzhien, Kalthamara (M).

Distribution: Peninsular India. *Habitat*: Shola forests.

Scapigerous herbs. Leaves 6-7 x 4 cm, elliptic, acute, irregularly crenate-serrate, densely bullate above, densely fulvous tomentose below; nerves 4 pairs, prominently reticulate below; petiole 1-3 cm long, 5 mm broad; central leaves sessile. Scapes few, to 12 cm long. Cymes glandular-hairy; pedicels 1 cm long. Flowers blue, subumbellate; sepals 2.5 x 1 mm, oblanceolate, obtuse, long-hairy; corolla 11 mm long, glandular-hairy, lobes obovate to orbicular; staminodes straight, bristle-like; ovary densely glandular, hairy. Capsule 2 x 0.2 cm, linear, densely glandular hairy.

Flowering & Fruiting: May - October.

Notes: Found in the moist rocky slopes of sholas ± 2000 m, common in Kodanad.

EPITHEMA Bl.

269. Epithema carnosum (G. Don) Benth. var. **hispida** Clarke in A. & C. DC., Monogr. Phan. 5: 178. 1883 & Hook.f., Fl. Brit. India 4: 369. 1884; Gamble, Fl. Pres. Madras 992 (697). 1924; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 133.1987. **(PLATE 29: 251)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Erect leafy herbs; stems succulent, pilose. Leaves opposite and alternate, 7-14 x 6-10 cm, ovate, rounded or cordate at base, obtuse at apex, upper ones sessile, hairy above and below; nerves 6-8 pairs. Flowers small, in terminal or axillary scorpioid cymes; pedicels 6 mm long, hairy; calyx 5 mm long, campanulate, lobes 5, acuminate, united above the middle; corolla 7 mm long, 2-lipped, lobes 5, subequal, white; stamens 2, free; staminodes 3 or 4; ovary ovoid, 1-celled, ovules many, placenta parietal, not intruded; style 1, stigma minute. Capsule 5 x 3 mm, ovoid, circumscissile; seeds twisted, brown, ridged.

Flowering & Fruiting: July - October.

Notes: Found in the moist region of sholas ± 2050 m, common in Ankinda.

RHYNCHOGLOSSUM Bl.

270. Rhynchoglossum notonianum (Wall.) Burtt, Notes Roy. Bot. Gard. Edinb. 24: 170. 1962 & Rev. Handb. Fl. Ceylon 3: 99. 1981; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 133.1987. *Wulfenia notoniana* Wall., Tent. Fl. Nepal. 46. 1826. *Klugia notoniana* (Wall.) A. DC. in DC., Prodr. 9: 276. 1845; Hook. f., Fl. Brit. India 4: 366. 1889; Gamble, Fl. Pres. Madras 990 (696). 1924; Fyson, Fl. South Indian Hill St. 3: t. 450. 1920. **(PLATE 29: 252)**

Distribution: South West India and Sri Lanka. *Habitat*: Shola forests.

Fleshy herbs, glabrous; stems thick. Leaves alternate and opposite, to 17 x 11 cm, ovate, acute at apex, cordate at base, inequilateral, acute on one side; nerves 17-20 pairs, regular, prominent below. Flowers in terminal racemes; bracts ovate, acute; pedicels to 5 mm long; sepals 5, 8 mm long, lanceolate, united below; corolla blue, 1-2.5 cm long, bilabiate, tube white, upper lip smaller, 2-lobed, lower lip broad; stamens 4, anthers connate in pairs; ovary 1-celled, ovules many, on 2-parietal placenta; style slender; stigma oblique. Capsule 6 x 4 mm, ovoid, loculicidal; seeds many, reticulate.

Flowering & Fruiting: July - December.

Utility: Used in Folk and Siddha medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

PSU & NKK, Kalhatty, 27.03.1991, II c 43 (Cairn Hills).

43. HAEMODORACEAE

1. Leaves linear-elliptic, distinctly petioled, over 2.5 cm broad; flowers purple .... ***Peliosanthes***
1. Leaves narrowly linear, petiole indistinct, under 1 cm broad; flowers white .... ***Ophiopogon***

OPHIOPOGON Ker.-Gawl.

271. Ophiopogon intermedius D. Don, Prodr. Fl. Nepal. 48. 1825; Hook. f., Fl. Brit. India 6: 269. 1892; Gamble, Fl. Pres. Madras 1499 (1048). 1928; Fyson, Fl. South Indian Hill St. 3: t. 530. 1932; K. Ramam. in A.N. Henry et al., Fl. Tamil Nadu 3: 31.1989. *Ophiopogon indicus* Wight, Ic. t. 2050. 1853. **(PLATE 29: 253)**

Common names: Thalaivalka, Orukkupullu (M).

Distribution: Endemic to India. *Habitat*: Grasslands.

Perennial herbs, densely tufted, scapigerous; rootstock rhizomatous. Leaves clustered, 25-40 x 0.7 cm, linear-oblong, ribbed, narrowed to the base into a petiole. Scape to 35 cm long. Flowers 4-10 in raceme, pedicel 5 mm long; tepals 6, white with pink shades, 6 x 4 mm, oblong, obtuse; stamens 6, filaments free, shorter than tepals; anthers sagittate at base; ovary 3-celled, cell 1-ovuled. Berry 7 mm across, globose, glabrous, blue; seeds 1-3, globose or trigonous.

Flowering & Fruiting: July - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Ankinda.

PSU & NKK, Kodanad, 10.07.1994, 259 (TNFDH); KNS, Uppalt RF, 07.02.1963, 21 (FRC).

PELIOSANTHES Ander.

272. Peliosanthes teta Andr. ssp. **humilis** (Andr.) Jessop, Blumea 23: 155. 1976 & in Steenis, Fl. Males. I. 9: 299. 1979; K. Ramam. in A.N. Henry et al., Fl. Tamil Nadu 3: 31.1989. *Peliosanthes humilis* Andr., Bot. Repos. 10, t. 634. 1808. *Peliosanthes neilgherrensis* Wight, Ic. t. 2052. 1853; Hook. f., Fl. Brit. India 6: 266. 1892; Gamble, Fl. Pres. Madras 1498 (1047). 1928. *Peliosanthes courtallensis* Wight, Ic. t. 2051. 1853; Hook. f., Fl. Brit. India 6: 266. 1892; Gamble, Fl. Pres. Madras 1498 (1047). 1928. **(PLATE 29: 254)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Perennial herbs, scapigerous, stem solitary or loosely tufted. Leaves few, clustered, 25-32 x 5-10 cm, elliptic, acute at both ends, plicate; petiole to 38 cm long. Racemes to 20 cm long, many-flowered; bracts 1 cm long, lanceolate. Flowers purple, many, 6-8 mm across, 1-few in each bract; tepals 6, oblong, connate at base; stamens 6, filaments shorter than tepals, united at base into a ring. Berry 8 x 8 mm, top-shaped, glabrous, bluish black; seeds 1-3, globose.

Flowering & Fruiting: March - August.

Utility: Used in Folk medicine.

Notes: Found in the shola floor ± 2050 m, common in Ankinda.

44. HALORAGACEAE

1. Terrestrial plants; 1-seeded .... *Laurembergia*
1. Aquatic plants; petals absent, seeds 2 or 4 .... *Myriophyllum*

LAUREMBERGIA P. Bergins.

273. Laurembergia coccinea (Blume) Kanitz in Mart., Fl. Bras. 13: 377. t.68. 1882; V. Chitra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 147.1983. *Epilithes coccinea* Blume, Bijdr. 734. 1826. *Serpicula brevipes* Wight & Arn., Prodr. 338. 1834; Gamble, Fl. Pres. Madras 453 (321). 1919; Fyson, Fl. South Indian Hill St. 3: t. 330. 1920. *Serpicula hirsuta* Wight & Arn., Prodr. 338. 1834; Gamble, Fl. Pres. Madras 453 (321). 1919. *Serpicula indica* Thw., Enum. Pl. Zeyl. 123. 1859p.p.; Hook. f., Fl. Brit. India 2: 431. 1878. **(PLATE 29: 255)**

Distribution: Indo-Malesia. *Habitat*: Marshy areas.

Procumbent herbs; stem pilose, reddish. Leaves to 1 x 0.5 cm, oblanceolate, dentate, hairy. Female flowers sessile, axillary, 3-5-together; sepals 4, 0.5 mm long, hispid; petals absent; ovary 1-celled; ovules 4; styles 4; short. Male flowers pedicelled; sepals 4, similar to female flowers; petals 4, 3 mm long, yellow; stamens 8, filaments short; anthers 3 mm long, oblong. Capsule 1-seeded, hispid, 1 mm long, subglobose.

Flowering & Fruiting: January - March.

Notes: Found in the marshy places of sholas ± 2000 m, common in Pykara falls.

PSU & NKK, Pykara, 26.01.1991, 35 (Cairn Hills); PSU & NKK, Kodanad, 17.08.1994, 123 (TNFDH).

MYRIOPHYLLUM L.

274. Myriophyllum oliganthum (Wight & Arn.) F. V. Muell., Fragm. Phyt. Austr. 10: 54. 1876; V. Chitra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 147.1983. *Haloragis oligantha* Wight & Arn., Prodr. 338. 1834. *Myriophyllum intermedium* Clarke in Hook.f., Fl. Brit. India 2: 433. 1878; Gamble, Fl. Pres. Madras 454 (321). 1919; Fyson, Fl. South Indian Hill St. 3: t. 331. 1920, non DC. 1828. **(PLATE 30: 256)**

Distribution: Peninsular India. *Habitat*: Marshy areas.

Aquatic floating herbs, glabrous. Leaves alternate, to 15 x 1 mm, linear, flat, glabrous; lower ones pinnatisect into filiform lobes. Flowers sessile, in axillary clusters; sepals

4, 1 mm long, oblong; petals absent; stamens 4, filaments short; anthers 1 mm long, oblong; ovary 4-celled, ovules solitary in each cell, pendulous; styles 4, free, plumose. Fruit 4-partite, fruitlets 0.5 mm long, tuberculate.

Flowering & Fruiting: March- April.

Notes: Found in the water stagnant region of sholas ± 2000 m, common in Pykara falls.

PSU & NKK, Ooty Botanical Garden, 28.03.1991, d 33, I d 3 (Cairn Hills).

45. HYDROCHARITACEAE

HYDRILLA Rich.

275. Hydrilla verticillata (L.f.) Royle, Illustr. Bot. Himal. t. 376. 1839; Hook. f., Fl. Brit. India 5: 659. 1888; Gamble, Fl. Pres. Madras 1396(977). 1928; S. R. Srinivas. in A.N. Henry et al., Fl. Tamil Nadu 3: 2.1989. *Serpicula verticillata* L.f., Suppl. Pl. 416. 1781. **(PLATE 30: 257)**

Common names: Hydrilla (E).

Distribution: Asia, Europe and Africa. *Habitat*: Marshy areas.

Caulescent, glabrous, profusely branched freshwater herbs with 5-50 mm long internodes and fibrous roots at some nodes. Leaves oblong-linear to lanceolate, green, margin serrate-dentate, apex acute-apiculate; nodal scales 2, axillary, membranous with orange brown cilia on margin. Male spathe 1.25-1.50 mm long, bursting open to liberate male flower, beset with subulate appendages. Male flower: sepals reflexed, 1.5-3 mm long; petals linear-spathulate, equalling the sepals, patent or reflexed, obtuse; stamens with minute filaments. Female spathe ca 5 mm long, reddish-brown striped, bidentate. Ovary oblong, 3.4 mm long, with 1.5-10 cm long slender rostrum. Fruits terete, 5-7 mm long. Seeds dark brown, ca 2.5 mm long.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk and Siddha medicine.

Notes: Found in the water stagnant region of sholas ± 2000 m, common in Pykara falls.

PSU & NKK, Pykara, 06.03.1991, d 123 (Cairn Hills).

46. HYPERICACEAE

HYPERICUM L.

1. Shrubs; flowers 5-8 cm across 2
1. Herbs; flowers 2.5 cm across 3

2. Styles exceeding the ovary; young branches 4-angled .... *H. mysurense*
2. Styles much shorter than the ovary; young branches terete .... *H. hookerianum*

3. Sepals with gland-tipped teeth; stamens 3-adelphous .... *H. wightianum*
3. Sepals entire; stamens many, free .... *H. japonicum*

276. Hypericum hookerianum Wight & Arn., Prodr. 99. 1834; Wight, Ic. t. 959. 1845; Hook.f., Fl. Brit. India 1: 256. 1874; Gamble, Fl. Pres. Madras 70 (51). 1915; Fyson, Fl. South Indian Hill St. 2: t. 29. 1932; V. Chitra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 26.1983; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 64. 1993. **(PLATE 30: 258)**

Distribution: India, Nepal, Bhutan and Myanmar. *Habitat*: Shola forests.

Glabrous subshrubs; stems terete, stout; branchlets terete or slightly angular or compressed. Leaves 2-9 x 1-3.5 cm, ovate or ovate-oblong to broadly lanceolate, cuneate at base, obtuse to subacute, mucronate at apex, entire, glabrous; petioles up to 2 mm long. Flowers yellow, solitary or 3-10 in 1-3-chotomous, corymbose or subcorymbose cymes, 4-6 cm across, bracts caducous. Sepals 5, 6-10 x 5-8 mm, obovate-elliptic to obovate or suborbicular, subobtuse to rotund at apex, entire or closely dentate towards apex and distantly towards base, persistent. Petals 5, 1.5-2 x 2-2.5 cm, obliquely obovate, black and brown glandular punctuate. Stamens 6-10 mm long, numerous, in 5 fascicles; filaments unequal, glabrous. Ovary 5-10 mm long, ovoid-oblong; styles 5, free. Capsules 1-1.5 cm long, ovoid-oblong to ovoid, tipped with persistent styles.

Flowering & Fruiting: April - November.

Notes: Found in the stream banks of sholas ± 2100 m, common in Ooty town.

277. Hypericum japonicum Thunb. ex Murr. in L., Syst. Veg. 702. 1784; Hook. f., Fl. Brit. India 1: 256. 1874; Gamble, Fl. Pres. Madras 70 (51). 1915; Fyson, Fl. South Indian Hill St. 2: t. 31. 1932; V. Chitra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 26.1983; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 69. 1993. **(PLATE 30: 259)**

Distribution: Indo-Malesia to Australia, New Zealand and East Asia. *Habitat*: Marshy areas.

Erect herbs. Leaves 8-10 x 4 mm, lanceolate, apex acute, base auricled, 3-ribbed, glabrous. Flowers solitary axillary or in terminal cymes; pedicels 5 mm long; sepals 3 x 1 mm, oblong, obtuse, many-ribbed; petals yellow, 4 x 1.5 mm, oblong; stamens many, free; ovary 1-celled, ellipsoid, styles 3, 1 mm long. Capsule 3 x 2 mm, smooth; seeds many, 0.5 x 0.3 mm, oblong 7-ribbed.

Flowering & Fruiting: April - August.

Utility: Used in Folk medicine. Reported to be used in asthma and dysentery.

Notes: Found in the marshy fallow fields of sholas ± 2050 m, common in Pykara falls.

PSU & NKK, Peechalhur, 13.02.1991, b 43 (Cairn Hills); KNS, Staircase shola, 23.04.1964, 1256 (FRC).

278. Hypericum mysurense Heyne ex Wight & Arn., Prodr. 99. 1834; Hook. f., Fl. Brit. India 1: 253. 1874; Gamble, Fl. Pres. Madras 70 (50). 1915; Fyson, Fl. South Indian Hill St. 2: t. 28. 1932; V. Chitra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 26.1983; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 71. 1993. *Norisca mysurensis* (Heyne ex Wight & Arn.) Wight, Ic. t. 56. 1838. **(PLATE 30: 260)**

Common names: Mysore St Johns Wort (E); Chinnadaavare gida, Kadavakke, Kadu yellu, Onnai (K); Avaramkola (M).

Distribution: Tropical Asia. *Habitat*: Shola border.

Shrubs. Leaves 20-30 x 7 mm, lanceolate, acute at both ends, closely placed, sessile; nerves 2 or 3 pairs, glabrous. Flowers 5-6 cm across, in terminal cymes, 2-3 together; sepals to 1 cm long, lanceolate; petals 2-2.5 x 1 cm, obovate, obtuse, glabrous; stamens arranged in 5 bundles, filaments 1 cm long; ovary 5-celled, styles 5, 10 mm long. Capsule 15 mm long, glabrous.

Flowering & Fruiting: Throughout the year.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 02.02.1991, b 44 (Cairn Hills); PSU & NKK, Kodanad, 30.09.1994, 303 & 14.11.1994, 586 (TNFDH); KNS, Kodanad, 09.05.1963, 508 (FRC).

279. Hypericum wightianum Wall. ex Wight & Arn., Prodr. 99. 1834; Gamble, Fl. Pres. Madras 70 (50). 1915; Fyson, Fl. South Indian Hill St. 2: t. 30. 1932; V. Chitra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 27.1983; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 78. 1993. *Hypericum napaulense* sensu Dyer in Hook. f., Fl. Brit. India 1: 256. 1874 p.p. non Choisy 1824. *Hypericum humifusum* sensu Dyer in Hook. f., Fl. Brit. India 1: 255. 1874,p.p. non L. 1753; Gamble, Fl. Pres. Madras 70 (51). 1915; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 67. 1993. **(PLATE 30: 261)**

Distribution: South and South East Asia and China. *Habitat*: Marshy areas.

Diffuse herbs; stems reddish. Leaves to 12 x 7 mm, oblong, obtuse at apex, rounded at base, purplish coloured; nerves 2-3 pairs. Flowers in terminal cymes, 2 or 3 together; sepals 4 x 2.5 mm, oblong, acute; petals yellow, 5 mm long, obovate, obtuse; stamens 3-adelphous; ovary glabrous, styles 3, 3 mm long. Capsule 4.5 x 3 mm, ellipsoid; seeds 0.8 x 0.4 mm, oblong, not ribbed, epidermal cells transversally oblong in vertical rows.

Flowering & Fruiting: Throughout the year.

Notes: Found in the marshy fallow fields of sholas ± 2050 m, common in Pykara falls.

47. HYPOXIDACEAE

1. Leaves pilicate; scape elongated; perianth tube not produced above ovary; fruit circumcissile .... ***Hypoxis***
1. Leaves flat; scape short, hidden in the leaf bases; perianth-tube produced above ovary; fruit indehiscent .... ***Curculigo***

CURCULIGO Gaertn.

280. Curculigo orchioides Gaertn., Fruct. 1: 63. t. 16. f.11. 1788; Hook. f., Fl. Brit. India 6: 279. 1892; Gamble, Fl. Pres. Madras 1502 (1050). 1928; Fyson, Fl. South Indian Hill St. 2: t. 260. 1932; V. Chandras. in A.N. Henry et al., Fl. Tamil Nadu 3: 35.1989. *Curculigo malabarica* Wight, Ic. t. 2043 A.1853. **(PLATE 30: 262)**

Common names: Nelataale (K); Nelpana, Nilappana (M); Black musale (E); Nilappanai (T).

Distribution: Indo-Malesia. *Habitat*: Grasslands.

Small herbs, rhizome to 15 cm long, oblong, perennial. Leaves 10-15 x 2 cm, lanceolate, plicate, base sheathing, pilose, subsessile. Perianth yellow, 1.5 cm across; tube 3 cm long, narrow, sparsely pilose; stamens 6, filaments erect; ovary 3-celled, ovules many, villous. Fruit baccate; seeds subglobose.

Flowering & Fruiting: June - December.

Utility: Used in Ayurveda, Folk, Siddha, Unani and Tibetian medicine. Tuberous roots are demulcent, diuretic and tonic. Useful in leucorrhoea, urinary diseases, menorrhagia, piles, jaundice, asthma, diarrhoea, gonorrhoea, itch and skin diseases.

Notes: Found in grasslands ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, a 75 (Cairn Hills); PSU & NKK, Kodanad, 10.10.1994, 268 (TNFDH).

HYPOXIS L.

281. Hypoxis aurea Lour., Fl. Cochinch. 200. 1790; Hook. f., Fl. Brit. India 6: 277. 1892; Fyson, Fl. South Indian Hill St. 3: t. 531. 1920; Gamble, Fl. Pres. Madras 1501 (1049). 1928; V. Chandras. in A.N. Henry et al., Fl. Tamil Nadu 3: 35.1989. **(PLATE 30: 263)**

Common names: Golden Star Grass (E).

Distribution: Indo-Malesia. *Habitat*: Grasslands.

Small herbs, rhizome globose, 1 cm long, perennial, roots fleshy. Leaves 10-15 x 0.5 cm, linear, radical, sessile. Scapes 2 or 3, slender, to 10 cm long. Flowers 1 or 2; perianth yellow, 1 cm long, pilose, lobes elliptic-lanceolate; stamens 6; ovary 3-celled, ovules many, stigma 3-lobed. Capsule 1 cm long, 3-vaved, cylindric-turbinate; seeds subglobose.

Flowering & Fruiting: May - August.

Utility: Used in Ayurveda medicine.

Notes: Found in grasslands ± 2050 m, common in Pykara.

48. ICACINACEAE

1. Flowers in axillary cymes; petals glabrous .... *Gomphandra*
1. Flowers in terminal panicles; petals densely villous .... *Nothapodytes*

GOMPHANDRA Wall. ex Lindley

282. Gomphandra coriacea Wight, Illustr. 1: 103. 1840; Gamble, Fl. Pres. Madras 195 (140). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 304.1920; S.R. Srinivas in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 71.1983; R. Mathur in N.P. Singh et al., Fl. India 5: 22. 2000. *Gomphandra polymorpha* Wight, Illustr. 1: 103. 1840 p.p. & Ic. tt. 953,954. 1843; Hook. f., Fl. Brit. India 1: 586. 1875; Gamble, Fl. Pres. Madras 195 (139). 1915. **(PLATE 30: 264)**

Common names: Chottamaram, Chakkimaram, Kambilichedi (M).

Distribution: South India and Sri Lanka. *Habitat*: Shola forest.

Trees, to 7 m high, bark dark grey, smooth; blaze yellow; branchlets green. Leaves simple, alternate, estipulate; petiole 5-15 mm long, slender, grooved above, glabrous; lamina 3-12 x 1.8-5 cm, elliptic, obovate or elliptic-obovate, base acute, apex obtuse, obtusely acute, acute or acuminate, margin entire, coriaceous; lateral nerves 3-7 pairs, pinnate, slender, faint, intercostae obscure. Flowers polygamo-dioecious, greenish-white, in leaf opposed cymes or rarely in axillary cymes; calyx minute, cup-shaped; lobes 4-5; corolla 4 mm long; lobes 4-5, acute, connate into a tube, lobes inflexed at apex; male flowers: stamens 4-5, exserted, free; filaments thick, fleshy often connate, usually with a tuft of club-shaped hairs on the back at the apex; anthers pendulous from the interior apex of the filaments, dehiscing longitudinally; disc thick, annular or 0; pistillode pubescent; female flowers: ovary superior, oblong, 1-celled, ovules 2; style conic; stigma small or discoid. Fruit a drupe, 15 x 8 mm, pale yellow, oblong-terete, crowned with the remains of persistent stigmas; endocarp wrinkled; seed pendulous, longitudinally surrounded by raphe.

Flowering & Fruiting: December - March.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

KNS, Longwood, 20.04.1963, 1223 (FRC).

NOTHAPODYTES Bl.

283. Nothapodytes nimmoniana (Graham) Mabb. in Manilal, Bot. Hist. Hort. Malab. 88. 1980; S.R. Srinivas in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 71.1983; R. Mathur in N.P. Singh et al., Fl. India 5: 31. 2000. *Premna nimmoniana* Graham, Cat. Pl. Bombay 155. 1839. *Stemonurus foetidus* Wight,

Ic. t. 955. 1845. *Mappia foetida* (Wight) Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 395. 1852; 1: 589. 1875; Gamble, Fl. Pres. Madras 196 (141). 1915; Fyson, Fl. South Indian Hill St. 2: t. 58. 1932. *Nothapodytes foetida* (Wight) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem. 15: 247. 1940 & Blumea 17: 232. 1969. *Mappia wightiana* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 397. 1852; Gamble, Fl. Pres. Madras 197(141). 1915. *Mappia tomentosa* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 397. 1852; Hook. f., Fl. Brit. India 1: 589. 1875; Gamble, Fl. Pres. Madras 196 (141). 1915. *Mappia ovata* Miers, Ann. Mag. Nat. Hist. ser. 2. 9: 396. 1852; Hook. f., Fl. Brit. India 1: 589. 1852; Gamble, Fl. Pres. Madras 197 (141). 1915. **(PLATE 31: 265, 265 a & b)**

Common names: Durvasane mara, Peenari, Yelugudassa (K); Peenari, Pulippacha (M); Arali, Chorla (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Trees, to 10 m high, bark yellowish, wrinkled; branchlets angled, appressed-hairy, corky, with prominent leaf scars. Leaves simple, alternate, estipulate; petiole 30-60 mm, stout, pubescent, grooved above; lamina 7-18 x 4-8 cm, broadly ovate, ovate-oblong or elliptic-oblong, base oblique, round or acute, apex acuminate, margin entire, glabrous above, pubescent beneath, coriaceous; lateral nerves 6-10 pairs, pinnate, prominent, intercostae scalariform; domatia present. Flowers bisexual, creamy yellow, 5 mm across, in terminal pubescent corymbose cymes or panicles; calyx cupular, 1 mm long, 5-toothed; petals 5, 3 mm long, villous within, apically inflexed; stamens 5, free; disc cupular; ovary ovoid, hairy, 1-celled, ovules 2; style angled; stigma stout. Fruit a drupe, 2 x 1 cm, ellipsoid, blackish-purple; seed glabrous.

Flowering & Fruiting: June - September.

Utility: Used in Folk and Modern medicine. The extract of leaves and young shoot is used in treating cancer.

Propagation: The seeds are viable for two months. The depulped seeds are dried under shade for about a week and then soaked in cow dung solution for 24 hrs and sown in well prepared mother beds. Germination is noticed after 30 days. The germination is of about 20 percent.

Notes: Fruit resembles jamun, or jambul fruit in taste and appearance, poisonous. Decorticated seeds yield yellowish brown, fluorescent oil. Found in the ecotone region

of sholas ± 2000 m, common in Pykara. The Red listed status of this species is Vulnerable for Tamil Nadu and Kerala and Endangered for Karnataka.

PSU & NKK, Kodanad, 10.05.1994, 47 (TNFDH); KNS, Windy Cape Road, 11.05.1963, 532 (FRC).

49. IRIDACEAE

SISYRINCHIUM L.

284. Sisyrinchium rosulatum E.P. Bicknell, Bull. Torrey Bot. Club 26: 228. 1899; Hornberger, Sida 14: 601. 1991; Chowlewa & Henders., Fl. N. America 26: 358. 2002; Sunil & Pradeep, Rheedea 21 (2): 170-172. 2011. **(PLATE 31: 266)**

Distribution: United States, Central America, Madagascar and Tamil Nadu. *Habitat*: Grasslands.

Caespitose annual herbs; rhizomes cylindrical; stems simple or 2-3 branched, winged. Leaves distichous, shorter than the stems, falcate-ensiform, 5-18 x 0.2-2.5 cm, scabrous at margins, acute at apex, 5-6 nerved. Inflorescence terminal, few-flowered rhipidia, 2-5 cm long, slender, foliaceous; outer bracts slightly falcate at apex, often 1-1.5 times longer than the inner bract. Flowers urceolate, 8-10 x 10-12 mm, creamy-white with dark yellow centre and purple eye-rings; pedicels slender, up to 1.2 cm long. Tepels 6, 2-whorled, free, oblanceolate, 8-10 x 1-1.5 mm, rounded at base, apiculate to aristulate at apex, 1-5 dark purple nerved. Stamens 3; stamial tube 1.5-1.8 mm long, glandular hairy towards the base, yellow; anthers 0.2-0.25 mm long, yellow, extrose. Ovary subglobose, with short stipitate glandular hairs of moderate density, 3-loculed; ovules numerous, 2-seriate in each cell, axile; style 3-fid above middle, usually included in the stamina tube; stigma capitates, ca 0.2 mm, excerted, hirsute, yellow. Capsules globose to subglobose, 3-4 mm across, pale beige to straw-coloured. Seeds numerous, angled, rugose, black with a shallow depression.

Flowering & Fruiting: April - December.

Notes: This species recently reported from the grasslands of Pykara and Shooting Point ± 2050 m.

50. JUNCACEAE

JUNCUS L.

1. Leaves culm like, terete; tepals equal .... *J. prismatocarpus*
1. Leaves grass-like, flat; tepals unequal .... *J. inflexus*

285. Juncus inflexus L., Sp. Pl. 326. 1753; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 51.1989. *Juncus glaucus* Ehrh. ex Sibth., Fl. Oxon. 113. 1794; Hook. f., Fl. Brit. India 6: 393. 1892; Fyson, Fl. South Indian Hill St. 3: t. 518. 1920; Gamble, Fl. Pres. Madras 1553 (1084). 1931. **(PLATE 31: 267)**

Distribution: Indo-Malesia. *Habitat*: Marshy areas.

Tufted herbs; stems to 50 cm long, 2 mm thick, terete, ridged, green, glabrous. Panicles 2-3 cm across, lateral, sessile, 3-6 cm below the apex of the stem. Flowers many, 2 mm long, globose, shortly pedicelled; perianth lobes 2 mm long, yellow. Capsule 2.5 x 1.5 mm, ovoid, obtuse; seeds 1 x 0.5 mm, curved-ellipsoid, acute, brown, closely striate.

Flowering & Fruiting: November - April.

Utility: Used in Folk medicine.

Notes: Found in the marshy region of sholas ± 2000 m, common in Pykara.

PSU & NKK, Mukurthi, 29.01.1991, b 12 (Cairn Hills); PSU & NKK, Kodanad, 30.11.1995, 368 (TNFDH); KNS, Kotagiri, 25.04.1963, 1313 (FRC).

286. Juncus prismatocarpus R. Br. ssp. **leschenaultii** (Gay ex Laharpe) Kirschner, Preslia 74: 249. 2002. *Juncus leschenaultii* Gay ex Laharpe, Essai Monogr. Jonc. 49. 1825. *Juncus prismatocarpus* var. *leschenaultii* (Gay) Buchenau in Engl., Bot. Jahrb. Syst. 6: 205. 1885. *Juncus prismatocarpus* sensu Hook. f., Fl. Brit. India 6: 395. 1892p.p.; Gamble, Fl. Pres. Madras 1553 (1084). 1931; Fyson, Fl. South Indian Hill St. 2: t. 269. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 51.1989. **(PLATE 31: 268)**

Distribution: Indo-Malesia to New Zealand. *Habitat*: Marshy areas.

Tufted herbs, rootstock creeping. Leaves both radical and cauline, to 6 x 0.3 cm, terete, hollow, septate; sheath to 2 cm, open, auricled. Cymes terminal, corymbose, 10-15 cm; bracts 1.5 mm, ovate, acuminate; outer perianth lobes concave, 3 mm, lanceolate, acute, hyaline; filaments 1.5 mm; ovary 0.8 mm, one celled, many ovuled, stigma 3-lobed, linear, twisted. Capsule 3 mm, prismatic.

Flowering & Fruiting: February - March.

Utility: Used in Folk medicine.

Notes: Found in the marshy region of sholas ± 2000 m, common in Pykara falls.

PSU & NKK, Anumapuram, 29.01.1991, b 11 (Cairn Hills).

51. LAMIACEAE (LABIATAE)

1. Upper lip of corolla absent; style terminal .... ***Teucrium***
1. Upper lip of corolla 1-2 or 4-lobed; style gynobasic **2**

2. Caly-tube with 'scutellum'; anther cells distinct, beared .... ***Scutellaria***
2. Calyx-tube without appendages; anther cells confluent **3**

3. Stamens ascending to the upper lip, or spreading and projecting straight forward **4**
3. Stamens decending lying upon or enclosed in the lower lip **8**

4. Stamens 2 .... ***Salvia***
4. Stamens 4 .... **5**

5. Calyx sub-regular, lobes sub-equal **6**
5. Calyx 2-lipped **7**

6. Corolla-limb obscurely 2-labiate, upper lip nearly flat; stamens exerted .... ***Pogostemon***
6. Corolla-limb 2-lipped, upper lip hooded; stamens included .... ***Leucas***

7. Calyx equally 5-toothed, aromatic .... ***Micromeria***
7. Calyx distinctly 2-lipped, non aromatic .... ***Clinopodium***

8. Calyx accrescent in fruit, tube 10-nerved; verticils discrete, in racemes or panicles **9**
8. Calyx unchanged in fruit, the upper lip at times deflected over mouth; verticils dense, in terete or 4-angled spikes .... ***Anisochilus***

9. Calyx conspicuously 2-lipped .... ***Plectranthus***
9. Calyx with 5 subequal teeth .... ***Isodon***

ANISOCHILUS Wall. ex Benth.

287. Anisochilus dysophylloides Benth., Pl. Asiat. Rar. 2: 19. 1830; Hook.f., Fl. Brit. India 4: 628. 1885; Gamble, Fl. Pres. Madras 1128 (788). 1924; Fyson, Fl. South Indian Hill St. 2: t. 216. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 171.1987. *Anisochilus purpureus* Wight, Ic. t. 1435. 1849. *Anisochilus dysophylloides* Benth. var. *purpureus* (Wight) Gamble, Fl. Pres. Madras 1128(788). 1924; Suddee & Paton, Kew Bull. 64: 249. 2009. *Anisochilus sericeus* Benth. in DC., Prodr. 12: 82. 1848; Hook. f., Fl. Brit. India 4: 629. 1885; Gamble, Fl. Pres. Madras 1128 (789). 1924.

Distribution: Peninsular India. *Habitat*: Rocky areas in grasslands.

Subshrubs; stem obtusely quadrangular, tomentose. Leaves to 3 x 1 cm, obovate, acute, cuneate at base, nearly sessile, densely tomentose. Spikes 5 cm long, 0.8 cm broad, many, terminal and upper axillary, peduncled; bracts 3 mm long, ovate. Flowers many; calyx 4 mm long, very densely hairy, upper lip declinate, closing the mouth; corolla 4 mm long; upper lip entire, concave; lower lip acutely 4-lobed, white; filaments glabrous. Nutlets mucilaginous when wet, trigonous, smooth, brown.

Flowering & Fruiting: December - March.

Notes: Found in the rocky region of sholas ± 2100 m, common in Sispara.

PSU & NKK, Kodanad, 20.09.1994, 615 & 28.09.1995, 338 (TNFDH).

CLINOPODIUM L.

288. Clinopodium umbrosum (M. Bieb.) K. Koch, Linnaea 11: 673. 1848. *Melissa umbrosa* M. Bieb., Fl. Taur.-caucas 2: 63. 1808. *Calamintha umbrosa* (M. Bieb). Rchb., Fl. Germ. Excurs. 1: 329. 1821; Hook. f., Fl. Brit. India 4: 650. 1885; Gamble, Fl. Pres. Madras 1139 (797). 1924; Fyson, Fl. South Indian Hill St. 3:t. 465. 1920. *Satureja umbrosa* (Bieb.) Scheele in Flora 26: 577. 1843; H. Keng in Steenis, Fl. Males. Ser. 1. 8: 361. 1978; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 186.1987. **(PLATE 31: 269)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Spreading diffuse herbs from a slender, perennial stock; branchlets slender, pilose with eglandular hairs, 4-angled. Leaves decussate, ovate, to 2.5 x 1.5 cm, base truncate, margin serrate, apex acute, puberulous above, more so on nerves below; petiole to 1 cm. Verticillasters terminal or in upper axils, to 2 cm wide; bracts and bracteoles linear, 4 mm. Calyx tubular-campanulate, tube 4 mm, curved, 1-3 nerved, puberulous without; limb 2-lipped; upper 3-lobed, lower 2-lobed, longer than upper. Corolla pink to purple, 5 x 3 mm wide; tube 6 mm; limb 2-lipped, 2+ 3, upper lip deflexed, 2-lobed, lower 3-lobed, mid-lobe larger. Stamens 4, didynamous, exserted, included in the upper lip of corolla. Disk equal. Ovary 4-celled; ovule 1 per cell, basal. Style gynobasic. Nutlets 4, erect, basilar.

Flowering & Fruiting: October - December.

Utility: Used in Folk medicine.

Notes: Found in the moist region and shola floor ± 2050 m, common in Pykara.

PSU & NKK, Upper Bhavani, 19.02.1991, c 78 & Ooty Botanical Garden 25.03.1995, d 38 (Cairn Hills); KNS, Bangitappal, 12.05.1963, 644 (FRC).

ISODON (Benth.) Spach.

1. Subshrubs; fruiting calyx upper lip entire, lower 4-lobed .... *I. coesta*
1. Herbs; fruiting calyx upper lip 3-lobed, lower 2-lobed or subequally 5-lobed **2**

2. Fruiting calyx gibbous at base, densely wooly, teeth rounded; corolla tube cylindric .... *I. nilgherricus*
2. Fruiting calyx not gibbous at base, minutely scabrous, teeth acute; corolla tube slightly saccate .... *I. wightii*

289. Isodon coesta (Buch.-Ham. ex D. Don) Kudo, Mem. Fac. Sci. Taihoka Imp. Univ. 2: 131. 1929. *Plectranthus coesta* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 117. 1825; Hook. f., Fl. Brit. India 4: 619. 1885; Gamble, Fl. Pres. Madras 1121(784). 1924. *Plectranthus coesta* var. *macraei* (Benth.) Hook.f., Fl. Brit. India 4: 619. 1885; Gamble, Fl. Pres. Madras 1121(784). 1924. *Plectranthus macraei* Benth., Labiat. Gen. Spec. 42. 1832; Fyson, Fl. South Indian Hill St. 3: t. 461. 1920. *Plectranthus menthoides* Benth. in Wall., Pl. Asiat. Rar. 2: 17. 1830; Hook.f., Fl. Brit. India 4: 620. 1885. *Rabdosia japonica* (Burm.f.) Hara, J. Jap. Bot. 47: 196. 1972. *Scutellaria japonica* Burm. f., Fl. Ind. 130. 1768. *Plectranthus japonicus* (Burm. f.) Koidz., Bot. Mag. (Tokyo) 43: 386. 1929; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 182.1987. **(PLATE 31: 270)**

Distribution: South Asia. *Habitat*: Shola border.

Large herbs, hirsute. Leaves to 7 x 3 cm, ovate, acute at apex, base obtuse, crenate, slightly decurrent to petiole, scabrous above, white pubescent below; petiole to 2 cm. Panicles axillary and terminal, to 20 cm; flowers blue; bracts 1 mm, ovate; calyx tube 1 mm, lobes 1 mm, ovate, 5-ribbed, pubescent outside; corolla 6 mm, slightly curved, pubescent outside; filaments 3 mm; ovary 1 mm, oblong.

Flowering & Fruiting: October - March.

Utility: Used in Folk medicine.

Notes: Found in shola undergrowth ± 1800 m, common in Naduvattam.

PSU & NKK, Pykara, 26.01.1991, II d 11 (Cairn Hills).

290. Isodon nilgherricus (Benth.) H.Hara, J. Jap. Bot. 60: 236. 1985. *Plectranthus nilgherricus* Benth. in DC., Prodr. 12: 57. 1848; Hook. f., Fl. Brit. India 4: 619. 1885; Gamble, Fl. Pres. Madras 1121(784). 1924; Fyson, Fl. South Indian Hill St. 3: t. 460. 1920; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 182.1987. *Rabdosia nilgherrica* (Benth.) Hara, J. Jap. Bot. 47: 198. 1972.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Shrubs, glandular hirtus. Leaves 5-10 x 3-6 cm, apex acute or acuminate, base rounded or cordate, serrate; upper ones sessile, acuminate, densely hairy below, nerves 4 pairs; petiole 3-5 cm long. Panicle 20-30 cm long. Flowers 3-5 together, pedicelled; calyx 3.5-4 mm long, strongly ribbed, subequally 5-lobed, hirtus; corolla 7 mm long, white with red dots, glandular, lobes ciliate, midlobe larger than sidelobes; filaments glabrous.

Flowering & Fruiting: October - February.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Sispara. The Red listed status of this species is Endangered for Karnataka Kerala and Tamil Nadu.

PSU & NKK, Kodanad, 20.09.1995, 321 (TNFDH).

291. Isodon wightii (Benth.) Hara, J. Japan Bot. 60: 237. 1985. *Plectranthus wightii* Benth., Labiat. Gen. Spec. 41. 1832; Hook. f., Fl. Brit. India 4: 619. 1855; Gamble, Fl. Pres. Madras 1120 (784). 1924; Fyson, Fl. South Indian Hill St. 3:t. 459. 1920; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 183.1987. *Plectranthus pulneyensis* Hook. f., Fl. Brit. India 4: 617. 1855. *Plectranthus nepetaefolius* Benth. in DC., Prodr. 12: 57. 1848; Hook. f., Fl. Brit. India 4: 619. 1855. *Robdosia wightii* (Benth.) Hara, J. Jap. Bot. 47: 203. 1972. **(PLATE 31: 271)**

Distribution: Peninsular India. *Habitat*: Grasslands.

Subshrubs, branchlets glabrescent. Leaves ovate, acute, base cordate, deeply serrate, membranous, sparsely hispid, to 7.5 x 6 cm; lateral nerves ca. 5 pairs; petiole to 7 cm long. Thyrsus to 15 cm long. Calyx hirtellous, red gland-dotted. Corolla lobes glabrous. Stamens exserted.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas and grasslands ± 1900 m, common in Western Catchment.

PSU & NKK, Outcherloney, 02.02.1991, II b 13 (Cairn Hills); PSU & NKK, Kodanad, 10.05.1994, 46 & 02.09.1994, 160 (TNFDH).

LEUCAS L.

1. Leaves quite entire 2
1. Leaves more or less crenate or serrate 5

2. Leaves 4 cm long, narrow, obtuse, coriaceous with revolute margin 3
2. Leaves up to 10 cm long, soft chartaceous, lanceolate, white tomentose beneath .... ***L. lanceifolia***

3. Branches pulvous, calyx white tomentose 4
3. Branches greenish-grey, calyx teeth triangular .... ***L. rosmarinifolia***

4. Leaves linear, 2.5 cm long, white tomentose beneath .... ***L. suffruticosa***
4. Leaves linear oblong, 5 cm long, tawny beneath, crowded at the end of the branches .... ***L. helianthemifolia***

5. Upper lip of corolla densely bearded with rufous hairs .... ***L. vestita*** **var.** ***angustifolia***
5. Upper lip of the corolla densely bearded with white hairs 6

6. Leaves thick 12 cm long, crenate, tawny-villose above, softly whitish-tomentose beneath .... ***L. lamiifolia***
6. Leaves narrow, usually under 2.5 cm broad, subobtuse, distintly and shallowly crenate, oblique 7

7. Leaves rather thick, oblong, tawny-pubescent, 7 cm long, shortly petioled .... ***L. hirta***
7. Leaves rather thin, linear obtuse, tawny-hispid pubescent, 5 cm long, sessile 8

8. Leaves linear-lanceolate; corolla 1 cm long .... ***L. beddomei***
8. Leaves elliptic-ovate; corolla 2 cm long .... ***L. sebaldiana***

292. Leucas beddomei (Hook. f.) Sunojk. & Mathew, Rheedea 12: 170. 2002. *Leucas hirta* (Heyne ex Roth) Spreng., var. *beddomei* Hook.f., Fl. Brit. India 4:687.1885; Gamble, Fl. Pres. Madras 1153(806). 1915; V. Singh, Monogr. Indian Leucas 93. 2001. **(PLATE 32: 272)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Erect undershrubs, 0.5-1 m tall, softly villous with spreading 1-1.5 mm long golden brown hairs. Leaves opposite decussate, 5-10 x 2-3 cm, elliptic, obtuse, base angustate, margin crenulate; petiole 1-1.5 mm long. Inflorescence dense and many flowered; bracts linear elliptic divergent, ciliate. Calyx 8 mm long, densely ciliate, inside glabrous, tube narrow; mouth straight; teeth 10, recurved in bud, ciliate. Corolla 1 cm long, upper lip erect, densely bearded with brownish yellow hairs; lower lip white, 3 lobed, middle lobe emarginated. Stamens didynamous, filaments with slender hairs.

Style slender, 10.5 mm long; stigma lower lobe 0.26 mm long, subulate, upper lobe minute; disc 4 lobed. Nutlets elliptic, triquetrous, top rounded and gland dotted, below smooth and shining, light brown.

Flowering & Fruiting: September - March.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Mukurthi.

PSU & NKK, Glenmorgan, 26.01.1991, d 3 (Cairn Hills); KNS, Masinigudi, 12.02.1963, 98 (FRC).

293. Leucas helianthemifolia Desf., Mem. Mus. Hist. Nat. 11: 2. 1824; Hook.f., Fl. Brit. India 4: 685. 1885; Fyson, Fl. South Indian Hill St. 3: t. 467. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 176.1987; V. Singh, Monogr. Indian Leucas 86. 2001. *Leucas ternifolia* Desf., Mem. Mus. Hist. Nat. Paris 11: 4. 1824; Gamble, Fl. Pres. Madras 1152 (805). 1924. **(PLATE 32: 273)**

Distribution: Endemic to Peninsular India. *Habitat*: Grasslands.

Stiff subshrubs from a woody stock; indumentum closely appressed-villous, golden. Leaves 3 per node or decussate (more when axillary buds are present), narrow oblong, to 2.5 x 0.5 cm, stiff, one-nerved, narrow at both ends, margin recurved, densely white-tomentose below, subsessile. Verticils often 2, subterminal on branchlets; bracts linear, shorter than calyx. Calyx-tube 5 mm; mouth straight, 10-toothed; teeth minute. Corolla-tube 4 mm; upper lip densely bearded with rugose hairs, shorter than lower lip. Stamens 4; filament-pairs 5 and 6 mm. Style 8 mm.

Flowering & Fruiting: July - February.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Kodanad.

KNS, Kodanad, 07.05.1963, 438 (FRC).

294. Leucas hirta (Heyne ex Roth) Spreng., Syst. Veg. 2: 743. 1825; Hook. f., Fl. Brit. India 4: 687. 1885; Fyson, Fl. South Indian Hill St. 3: t. 470. 1920; Gamble, Fl. Pres. Madras 1153 (806). 1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 176.1987. *Phlomis hirta* Heyne ex Roth, Nov. Pl. Sp. 264. 1821. **(PLATE 32: 274)**

Common names: Thumbae (K).

Distribution: Peninsular India. *Habitat*: Grasslands.

Erect herbs; branches covered with reflexed hairs. Leaves 5-6 x 1.5 cm, elliptic, obtuse, acute at base, distantly crenate, hirtus above, densely tomentose beneath; petiole 8 mm long. Heads terminal; bracts 10 x 1 mm, linear, bristly. Flowers 15-30 in a head; calyx tube 7 mm long, white, densely hairy outside; corolla tube 5 mm long, upper lip emarginate, white, hairy, midlobe of lower lip emarginate.

Flowering & Fruiting: September - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Mukurthi.

295. Leucas lamiifolia Desf., Mem. Mus. Hist. Nat. Paris 11: 4, t. 2. f. 1. 1824; Hook. f., Fl. Brit. India 4: 686. 1885; Gamble, Fl. Pres. Madras 1153 (806). 1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 177.1987; V. Singh, Monogr. Indian Leucas 95. 2001. **(PLATE 32: 275)**

Common names: Perumthumba (M).

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Ascending shrubs, upto 2 m high; branches woody, 4-gonous, villous-tomentose with long, spreading, brown hairs. Leaves opposite, 5-12 x 3-6.5 cm, ovate, subacute to subacuminate, rounded or subcordate at base, crenate-serrate, thick, villous-tomentose both sides; petioles 1-2 cm long, tomentose with brown hairs. Flower-whorls dense, many-flowered, subglobose, head-like, 2.5-3 cm in diam., terminal at the end of stem and branches, subtended by a pair of leaves, rarely an additional flower-whorl develops in the next lower axil of leaves. Bracts 8-10 mm long, about as long as calyx, linear-lanceolate, densely long-ciliate. Calyx-tube 8-10 mm long, tubular-campanulate, straight, rather more densely hairy outside above the middle, throat hairy within; mouth truncate; villi dense, shorter than teeth; teeth 10, ca 2.5 mm long, about one-third the length of tube, linear, hairy, spreading. Corolla-tube completely included within the calyx; upper lip densely bearded with long white hairs. Nutlets ca 3 mm long, oblong, smooth.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Naduvattam.

PSU & NKK, Pykara, 18.02.1991, d 5 (Cairn Hills); PSU & NKK, Kodanad, 30.05.1995, 377 (TNFDH).

296. Leucas lanceifolia Desf., Mem. Mus. Hist. Nat. Paris 11: 5, t. 2. f. 2. 1824; Hook. f., Fl. Brit. India 4: 685. 1885; Gamble, Fl. Pres. Madras 1153 (806). 1924; Fyson, Fl. South Indian Hill St. 2: t. 223. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 177.1987; V. Singh, Monogr. Indian Leucas 102. 2001. **(PLATE 32: 276)**

Distribution: Peninsular India. *Habitat*: Shola margins.

Bushy shrubs; branchlets 4-angled, densely reddish tomentose. Leaves decussate, (ob)lanceolate, to 11 x 2.5 cm, base acute, margin subentire and slightly revolute, apex apiculate, scaberulous above, glaucous below; petiole to 2 cm; bracts linear, to 1.3 cm. Verticils axillary on the upper axils, to 2.5 cm wide. Calyx tubular, 0.8 cm, 8-10-ribbed; mouth straight; teeth 8-10, longer than the ring of hairs. Corolla-tube 1.3 cm; limb 2-lipped, 4 + 1. Stamens 4. Nutlets oblong, 4 x 2.5 mm, brownish.

Flowering & Fruiting: January - June.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Mukurthi.

PSU & NKK, Wenlockdowns, 27.01.1991, d 4 (Cairn Hills); PSU & NKK, Kodanad, 17.08.1994, 129 (TNFDH); KNS, Staircase shola, 09.02.1963, 67 (FRC).

297. Leucas rosmarinifolia Benth. in Wall. Pl. Asiat. Rar. 1: 61. 1830; Hook. f., Fl. Brit. India 4: 685. 1885; Gamble, Fl. Pres. Madras 1152 (806). 1924; Fyson, Fl. South Indian Hill St. 2: t. 221. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 178.1987; V. Singh, Monogr. Indian Leucas 134. 2001. **(PLATE 32: 277)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Much-branched, low shrubs, 30-60 cm high; stem and branches terete, greenish-grey, woody, strigose or villous with erect hairs. Leaves sessile, apparently fascicled or few opposite, 2-5 x 0.3-0.5 cm, linear, obtuse, entire and revolute-margined, strigose above and on the mid-rib beneath, elsewhere grey-white tomentose with short hairs beneath. Flower-whorls 1 or 2, terminating leafy branches, 1.5-2.5 cm in diam., each subtended by three or a pair of leaves. Bracts 5-7 mm long, linear or linear-oblong, rigid, villous beneath with long erect hairs, long ciliate, pointed at tip, longer or as long as calyx. Calyx-tube sessile, 5-6 mm long, straight, campanulate-turbinate, hispid; mouth truncate; villi 2-3 mm long, white, much longer than teeth; teeth 10, 0.5-1 mm long,

triangular, closing over the fruit. Corolla-tube little exserted; upper lip bearded with long white hairs, as long as 3-lobed lower lip. Anthers glabrous. Nutlets 2-3 mm long, obtusely 3-gonous, yellowish brown.

Flowering & Fruiting: May - September.

Notes: Found in the ecotone region of sholas and grasslands ± 1950 m, common in Madithurai.

PSU & NKK, Kodanad, 16.03.1991, d 6 (Cairn Hills); PSU & NKK, Kodanad, 28.09.1995, 138 (TNFDH).

298. Leucas sebaldiana Sunojk., Candollea 60: 233. 2005. **(PLATE 32: 278)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Straggling herbs with woody root stock; branches long, grooved, terete, hispid with long golden brown hairs. Leaves opposite, decussate, ovate to lanceolate, 3-8 cm long and 3-5.5 cm broad, almost two times longer than broad, subacute, sometimes obtuse, base rounded to obtuse, margin serrated; petiole 1-2 cm long, hispid. Inflorescence a terminal solitary verticillaster subtended by a pair of leaves, 2.5-3.5 cm across, sub-globose with uneven margin due to the varied length and divergent nature of the flowers, dense many-flowered. Bracteoles broad, recurved, foliaceous Flowers 15-25, pedicel ±1 mm long. Calyx tubular, size varying, 1.5-2 cm long, narrowed and glabrous towards the base, slightly bulged and dense long hispid in the middle; teeth 10, straight, subequal, 3-4 mm long; fruiting calyx more bulged in the middle. Corolla 22-24 mm long, tube 10-11 mm long, slightly bent and fully included in the calyx, annulate around the middle inside with a ring of fleshy hairs; lower lip white, middle lobe fan shaped and 8-9 mm broad, side lobes small, 2 mm wide at the free end; upper lip yellowish brown. Stamens fully included and as long as the upper lip of corolla, upper pair shorter ; filaments hairy; anthers reddish coloured. Disc cup shaped and equally four-lobed. Carpel locules ±1 mm high, above moderately rounded; style 15-16 mm long, slender; stigma lobes unequal. Nutlets 2.9-3 mm long and 1.7 mm broad at middle, black, oblong, obtusely triangular in middle cross section, top rounded and glabrous.

Flowering & Fruiting: September - February.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

299. Leucas suffruticosa Benth., Labiat. Gen. Spec. 611. 1834; Hook. f., Fl. Brit. India 4: 685. 1885; Gamble, Fl. Pres. Madras 1152 (805). 1924; Fyson, Fl. South Indian Hill St. 2: t. 222. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 178.1987; V. Singh, Monogr. Indian Leucas 142. 2001. **(PLATE 32: 279)**

Distribution: Peninsular India. *Habitat*: Grasslands.

Much branched undershrubs, with long and stout root stock; branches terete, rigid, hispid with erect-appressed hairs and few bristle-like spreading hairs. Leaves sessile or subsessile, opposite, 1-3 x 0.15-0.3 cm, linear, obtuse, entire and revolute-margined, ciliate with bristle-like hairs, white tomentose beneath, coriaceous. Flower-whorls many-flowered, terminating 8-25 cm long, scapiform, tomentose branches, sometimes scape further extends ending in an another whorl of flowers, each whorl subtended by a pair of leaves. Bracts upto 3 mm long, about half as long as calyx, linear, setaceous, villous. Calyx-tube 6-7 mm long, campanulate, villous with golden yellow hairs; mouth truncate; villi as long as teeth; teeth ca 1 mm long, erect, spinulose. Corolla-tube included or ca 1 mm exserted from the calyx; upper lip densely bearded with white hairs, shorter than lower. Nutlets ca 3 mm long, oblong, narrowed towards base, smooth, brownish black.

Flowering & Fruiting: June - October.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Sispara.

PSU & NKK, Parson's valley, 13.03.1991, d 2 (Cairn Hills); PSU & NKK, Kodanad, 25.08.1994, 247 & 20.09.1994, 388 (TNFDH).

300. Leucas vestita Wall. ex Benth. var. **angustifolia** Hook.f., Fl. Brit. India 4: 687. 1885; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 178.1987. *Leucas ciliata* Benth. var. *angustifolia* (Hook.f.) Sunojk., Candollea 63: 83. 2008.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Stout herbs; indumentums tawny-villous. Leaves lanceolate, to 10 x 4 cm, base cuneate, margin crenate-serrate, apex acute, shaggy above, tomentose below; petiole to 1 cm. Verticils terminal or in upper axils, to 3 cm wide; bracts to 1.8 cm , 1 nerved, ciliate; bracteoles 1 cm, densly hairy. Calyx-tube 8mm, mouth straight, 10-tooth; teeth 2mm.

Corolla tube 1 cm, curved, limb 2-lipped; upper lip brown, villous without, as long as lower lip. Stamens 4; filament-pairs 6 and 7 mm; style 1.6cm.

Flowering & Fruiting: November - February.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Mukurthi.

MICROMERIA Benth.

301. Micromeria imbricata (Forssk.) C.Chr., Dansk Bot. Ark. 4: 21. 1922. *Thymus imbricatus* Forssk., Fl. Aegypt.-Arab. 108. 1775. *Thymus biflorus* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 112. 1825. *Micromeria biflora* (Buch.-Ham. ex D. Don) Benth., Labiat. Gen. Spec. 378. 1834; Hook. f., Fl. Brit. India 4: 650. 1885; Gamble, Fl. Pres. Madras 1138 (796). 1924; Fyson, Fl. South Indian Hill St. 2: t. 278. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 179.1987. **(PLATE 32: 280)**

Common names: Thilakanthai (T).

Distribution: West Asia, India and South Africa. *Habitat*: Shola margins.

Aromatic tufted wiry herbs; stems slender, pubescent; rootstock woody. Leaves opposite, sessile, up to 0.7 x 0.5 cm, ovate-suborbicular entire. Flowers in axillary, lax cymose verticels. Calyx 10-nerved. Corolla pink. Nutlets ovoid, smooth.

Flowering & Fruiting: January - May.

Utility: Used in Folk medicine.

Notes: Found in the shola floor and bare slopes of plateau ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, L 7 (Cairn Hills); PSU & NKK, Kodanad, 02.08.1995, 280 (TNFDH); KNS, Berijam, 31.01.1967, 2709 (FRC).

PLECTRANTHUS L' Herit

1. Filaments connate basally into a stamina sheath; calyx villous .... ***P. barbatus***
1. Filaments free; calyx tube glabrous within **2**

2. Leaves less than 4 cm wide, base cuneate .... ***P. inflatus***
2. Leaves more than 6 cm wide, base cordate to rounded .... ***P. glabratus***

302. Plectranthus barbatus Andr., Bot. Repos. t. 594. 1809; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 181.1987. *Coleus barbatus* (Andr.) Benth. in Wall., Pl. Asiat. Rar. 2: 15. 1830; Hook. f., Fl. Brit. India 4: 625. 1885; Gamble, Fl. Pres. Madras 1124(786). 1924; Fyson, Fl. South Indian Hill St. 2: t. 215. 1932. *Coleus forskohlii* auct. non (Willd.) Briq. 1897. **(PLATE 33: 281)**

Common names: Makanthi, Panikoorka (M).

Distribution: India, Sri Lanka and Tropical East Africa. *Habitat*: Shola forests.

Pubescent herbs. Leaves to 8 x 4 cm, ovate, elliptic, apex obtuse, base cuneate, crenate, pubescent; petiole to 3 cm. Racemes terminal, to 20 cm long; bracts 4 mm, broadly ovate, acuminate, ciliate; calyx inside with a ring of hairs upper lip 4 mm, ovate, acuminate, lower 4 toothed, 2 mm, all ciliate; corolla tube 6 mm, lower lip broadly ovate, 6 mm, violet; staminal sheath to 4 mm; style 1.5 cm, bifid.

Flowering & Fruiting: October - December.

Utility: Used in Ayurveda medicine.

Notes: Found in shola edges ± 2050 m, common in Dodabetta.

PSU & NKK, Kodanad, 20.07.1995, 266 (TNFDH).

303. Plectranthus glabratus (Benth.) Alston in Trim., Handb. Fl. Ceylon 6 (Suppl.): 236. 1931. *Coleus glabratus* Benth., Labiat. Gen. Sp. 58. 1832. *Coleus wightii* Benth., Labiat. Gen. Spec. 58. 1832. *Plectranthus coleoides* Benth. in DC., Prodr. 12: 64. 1848; Hook. f., Fl. Brit. India 4: 622. 1885; Gamble, Fl. Pres. Madras 1122 (785). 1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 181.1987. **(PLATE 33: 282)**

Common names: Padappayila (M).

Distribution: Peninsular India. *Habitat*: Shola forests.

Fleshy subshrubs, pubescent. Leaves to 18 x 12 cm, ovate-elliptic, membranous, puberulus, acuminate, base obtuse or slightly truncate, margin coarsely and prominently truncate; petiole to 10 cm. Panicles of racemes terminal, to 25 cm long, racemes to 3.5 cm; flowers pink. Fruiting calyx 2-lipped to 8 mm, upper lip entire, ovate, lower lip 4-toothed, teeth unequal, glabrous. Nutlets 4, oblong, 2 x 2 mm, brown, shining.

Flowering & Fruiting: August - October.

Notes: Found in shola border ± 2050 m, common in Mukurthi.

304. Plectranthus inflatus (Benth.) Willemse, Blumea 25: 509. 1979. *Coleus inflatus* Benth., Labiat. Gen. Spec. 58. 1832; Hook. f., Fl. Brit. India 4: 626. 1885.

Distribution: India and Sri Lanka. *Habitat*: Grasslands.

Herbs; stem acutely quandrangular, winged at angles. Leaves opposite, ovate-elliptic, acuminate, cuneate or truncate at base; scabrid above, pilose on the nerves beneath, dotted with oil globules, up to 20 x 8 cm. Flowers in long cymose, terminal panicles. Corolla purple. Nutlets ovoid to oblong.

Flowering & Fruiting: September - November.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Mukurthi.

POGOSTEMON Desf.

1. Inflorescence unbranched, uninterrupted; filaments beared **2**
1. Inflorescence branched, interrupted; filaments unbeared **4**

2. Branchlets with elongate tawn hairs; corolla lobes subequal .... ***P. auricularius***
2. Branchlets otherwise; corolla lobes unequal **3**

3. Leaves membranous, glabrescent; fruiting calyx glabrous .... ***P. wightii***
3. Leaves subcoriaceous, tomentose; fruiting calyx villous .... ***P. mollis***

4. Spikes or racemes of clusters terminal and axillary, a panicle **5**
4. Spikes or racemes of clusters terminal and axillary, solitary, not a panicle .... ***P. speciosus***

5. Tender parts glabrous; leaves acuminate, less than 4 cm wide .... ***P. pubescens***
5. Tender parts hoary-pubescent; leaves acute more than 6 cm wide .... ***P. benghalensis***

305. Pogostemon auricularius (L.) Hassk. in Tijdsch. Nat. Gesch. 10: 127. 1843; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 184.1987. *Mentha auricularia* L., Mant. Pl. 1: 81. 1767. *Dysophylla auricularia* (L.) Blume, Bijdr. 826. 1826; Hook. f., Fl. Brit. India 4: 638. 1885; Gamble, Fl. Pres. Madras 1135 (794). 1924; Fyson, Fl. South Indian Hill St. 3: t. 464. 1920. **(PLATE 33: 283)**

Distribution: Indo-Malesia to Australia and South China. *Habitat*: Shola margins.

Scandent herbs; stem terete, villous. Leaves to 6 x 2 cm, lanceolate, acute, rounded at base, crenulate, densely glandular villous. Spike 7 x 1 cm, cylindrical, terminal; bracts ovate, bracteoles lanceolate. Flowers many, densely packed; calyx 1.5 mm long; lobes 5, equal; corolla 3 mm long; lobes 4, equal, obtuse, hairy; stamens 4, filaments bearded, anthers 1-celled; ovary glabrous, style slender, stigma 2-lobed. Nutlets glabrous, smooth, brown.

Flowering & Fruiting: February - July.

Utility: Used in Folk medicine.

Notes: Found in shola border ± 2000 m, common in Pykara.

PSU & NKK, Kodanad, 02.09.1994, 529 & 20.07. 1995, 270 (TNFDH).

306. Pogostemon benghalensis (Burm.f.) O. Ktze., Rev. Gen. Pl. 2: 517. 1891; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 184.1987. *Origanum benghalense* Burm. f., Fl. Ind. 128,t.38, f. 3. 1768. *Pogostemon plectranthoides* Desf., Ann Mus. Natl. Hist. Nat. Paris 2: 156. t. 6. 1808; Hook. f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Pres. Madras 1133 (793). 1924. **(PLATE 33: 284)**

Common names: Ramtulasi (K); Bhoothachedayan (M).

Distribution: India. *Habitat*: Shola margins.

Scandent herbs; stem terete, villous. Leaves to 6 x 2 cm, lanceolate, acute, rounded at base, crenulate, densely glandular villous. Spike 7 x 1 cm, cylindrical, terminal; bracts ovate, bracteoles lanceolate. Flowers many, densely packed; calyx 1.5 mm long; lobes 5, equal; corolla 3 mm long; lobes 4, equal, obtuse, hairy; stamens 4, filaments bearded, anthers 1-celled; ovary glabrous, style slender, stigma 2-lobed. Nutlets glabrous, smooth, brown.

Flowering & Fruiting: January - March.

Utility: Used in Folk medicine.

Notes: Found in shola border ± 1800 m, common in Naduvattam.

KNS, Bandy shola, 11.05.1963, 557 (FRC).

307. Pogostemon mollis Benth., Labiat. Gen. Spec. 155. 1833; Hook. f., Fl. Brit. India 4: 635. 1885; Gamble, Fl. Pres. Madras 1134 (793). 1924; Fyson, Fl.

South Indian Hill St. 3: t. 463. 1920; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 184.1987. **(PLATE 33: 285)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola margins.

Branched subshrubs; branchlets several, hirsute, ascending. Leaves ovate-orbicular, to 3 x 1.5 cm, base cuneate, margin crenate, apex acute; petiole to 0.5 cm. Racemes spicate, uninterrupted, to 9 cm, mostly terminal; bracts linear. Calyx-lobes 5, subequal, 4.5 mm. Corolla white, 3 mm wide; limb obscurely 2-lipped; lobes 6 mm, obtuse. Stamens 4; 3 filaments longer, to 5mm.

Flowering & Fruiting: October - February.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Sispara.

PSU & NKK, Outcherloney, 02.02.1991, d 15 (Cairn Hills).

308. Pogostemon pubescens Benth. in DC., Prodr. 12: 142. 1848; Gamble, Fl. Pres. Madras 1133 (792). 1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 184.1987. *Pogostemon parviflorus* Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830p.p.; Hook. f., Fl. Brit. India 4: 632. 1885. **(PLATE 33: 286)**

Distribution: India and Sri Lanka. *Habitat*: Shola margins.

Shrubs. Leaves to 8 x 4 cm, ovate, apex acute, base cuneate, doubly crenate membranous, sparsely hirsute; petiole to 3.5 cm. Panicles axillary and terminal; bracts 5 x 1 mm, oblong, ciliate; calyx tube 4 mm, tooth 1 mm, pubescent; corolla tube 3 mm, upper lip, 3-lobed, 5 mm, lower lip 5 mm; filaments 6 mm, bearded.

Flowering & Fruiting: November - December.

Utility: Used in Folk medicine.

Notes: Found in open areas of sholas ± 2100 m, common in Ankinda.

309. Pogostemon speciosus Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Hook. f., Fl. Brit. India 4: 637. 1885; Gamble, Fl. Pres. Madras 1134(793). 1924; Fyson, Fl. South Indian Hill St. 2: t. 217. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 185.1987. **(PLATE 33: 287)**

Distribution: South India. *Habitat*: Shola margins.

Erect shrubs; stem covered with deflexed hairs. Leaves to 7 x 5 cm, ovate, rounded at base, irregularly crenate, strigose; nerves 5-pairs. Spikes 10 cm long, solitary terminal; rachis reflexed hairy; bracts and bracteoles minute, linear. Flowers many, perpendicular to the axis or deflexed; calyx 6 mm long, lobes acute to acuminate, strigose along the nerves outside; corolla yellow to white, 11 mm long, lobes obtuse, hairy; filaments hairy at extreme base; ovary densely glandular.

Flowering & Fruiting: November - January.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Dodabetta.

PSU & NKK, Outcherloney, 01.02.1991, II d 16 (Cairn Hills); PSU & NKK, Kodanad, 11.09.1995, 312 (TNFDH); KNS, Dodabetta, 17.02.1982, 7903(FRC).

310. Pogostemon wightii Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Hook. f., Fl. Brit. India 4: 635. 1885; Gamble, Fl. Pres. Madras 1134 (793). 1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 185.1987. **(PLATE 33: 288)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola margins.

Subshrubs; branches quadrangular, strigose. Leaves 5-6 x 3-4 cm, ovate, acute at apex, rounded at base, densely strigose, irregularly crenate; nerves 4 pairs. Spikes 4-8 cm long, 1-1.5 cm broad, terminal, continuous with peduncled clusters of flowers, axis densely hairy; bracts linear, ciliate. Flowers perpendicular to the axis; calyx 4 mm long, lobes with bristles along margins; corolla 5 mm long; middle lobe of upper lip narrower, hairy; filaments bearded. Nutlets biconvex to triangular, brown, smooth.

Flowering & Fruiting: December - January.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

KNS, Longwood, 20.04.1964, 1222 (FRC).

SALVIA L.

311. Salvia leucantha Cav., Ic. 1: 16, t. 24. 1791; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 186.1987. **(PLATE 33: 289)**

Common names: Mexican Bush Sage (E).

Distribution: Native of Tropical America. *Habitat*: Grasslands, a garden escaped.

Diffuse subshrub; branchlets with deciduous white tomentum. Leaves narrow, oblong-lanceolate, to 9 x 2 cm, base truncate, margin crenate, apex acute, white tomentose

below; petiole to 1.3 cm. Racemes to 15 cm; verticils interrupted. Calyx violet to purple, 1 x 0.6 cm, densely woolly without, upper lip entire, lower one equally 2-fid. Corolla white, 1.8 x 0.7 cm wide, throat swollen, limb lanate. Stamens 2; staminodes 0. filaments 4 mm, connectives deflexed, 6 mm, articulate. Ovary 4-celled and lobed; ovule 1 per cell, basal; style 2 cm, pubescent. Nutlets 4, ovoid, compressed.

Flowering & Fruiting: November - May.

Notes: Naturalised in the open areas and wastelands ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 22.02.1991, d 18 (Cairn Hills); PSU & NKK, Kodanad, 14.11.1994, 236 (TNFDH).

SCUTELLARIA L.

1. Leaves cauline, the floral leaves much smaller and bracteate 2
1. Leaves cauline gradually smaller upwards as they pass into floral leaves .... ***S. barbata***

2. Erect herbs; leaves purplish below .... ***S. wightiana***
2. Flexuous herbs; leaves green on either side .... ***S. violacea***

312. Scutellaria barbata D. Don, Prodr. Fl. Nepal. 109. 1825. *Scutellaria rivularis* Benth. in Wall., Pl. Asiat. Rar. 1: 66. 1830; Hook. f., Fl. Brit. India 4: 670. 1885; Gamble, Fl. Pres. Madras 1142 (799). 1924; Fyson, Fl. South Indian Hill St. 1: 329. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 186.1987. **(PLATE 34: 290)**

Distribution: India and China. *Habitat*: Shola border.

Stiff herbs; stem glandular-pilose. Leaves to 3 x 1 cm, acute at base and apex, distantly crenate, 3-nerved, densely white-glandular; petiole 5-10 mm long. Racemes 10 cm long; bracts orbicular, cuspidate. Flowers paired, calyx 6 x 4 mm, hairy, both lips saccate; corolla 10 mm long, lobes acute; anthers hairy. Nutlets globose, granulate, black.

Flowering & Fruiting: October - December.

Notes Found in moist region of shola border ± 2050 m, common in Ankinda.

PSU & NKK, Kodanad, 28.07.1995, 273 (TNFDH); KNS, Longwood, 08.05.1963, 483A (FRC).

313. Scutellaria violacea Heyne ex Benth. in Wall., Pl. Asiat. Rar. 1: 66. 1830; Hook. f., Fl. Brit. India 4: 668. 1885; Gamble, Fl. Pres. Madras 1142 (798).

1924; Fyson, Fl. South Indian Hill St. 2: t. 219. 1932; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 187.1987. *Scutellaria violacea* Heyne ex Benth. var. *sikkimensis* Hook.f., Fl. Brit. India 4: 668. 1885. **(PLATE 34: 291)**

Common names: Kattuthulasi (M).

Distribution: South India and Sri Lanka. *Habitat*: Shola margins.

Erect herbs; stem hispid. Leaves to 7 x 5 cm, ovate, acute, crenate, base cordate, hispid; petiole 4-5 cm long. Racemes 15 cm long, glandular hispid; bracts ovate, 3 mm long. Flowers paired, long-pedicelled; calyx glabrous, upper lobe 7 x 5 mm, saccate, lower lip 4 x 3 mm; corolla pale blue, 15 mm long, lateral lobes of lower lip shorter, glabrous; filaments fimbriate at base; anthers bearded, confluent. Nutlets spherical, tuberculate.

Flowering & Fruiting: February - May.

Notes: Found in moist region of shola border ± 2050 m, common in Pykara.

PSU & NKK, Glenmorgan, 27.01.1991, II b 20 (Cairn Hills); KNS, Longwood, 20.04.1964, 1216 (FRC).

314. Scutellaria wightiana Benth. in Wall., Pl. Asiat. Rar. 1: 67. 1830; Gamble, Fl. Pres. Madras 1142 (798). 1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 187.1987. *Scutellaria violacea* Heyne ex Benth. var. *hispidior* Benth. in DC., Prodr. 12: 418. 1848; Hook. f., Fl. Brit. India 4: 668. 1885. **(PLATE 34: 292)**

Distribution: Peninsular India. *Habitat*: Shola margins.

Erect herbs; stem densely hairy. Leaves 8 x 6 cm, ovate, cordate at base, purplish below, crenate, acute at apex, densely hairy; petiole 3 cm long, reddish. Raceme 12-16 cm long, slender, glandular hairy. Flowers paired, distant; bracts ovate; calyx glabrous, white, upper lip 6.5 x 5 mm, orbicular, concave; lower lip smaller; corolla pale pink, 13 mm long, hairy. Nutlets spherical, rugose.

Flowering & Fruiting: July - December.

Notes: Found in moist region of shola border ± 2000 m, common in Sispara.

TEUCRIUM L.

315. Teucrium tomentosum Heyne ex Benth. in Wall., Pl. Asiat. Rar. 1: 58. 1830; Hook. f., Fl. Brit. India 4: 700. 1885; Gamble, Fl. Pres. Madras 1158 (809).

1924; S. R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 187.1987. **(PLATE 34: 293)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola margins.

Erect shrubs; branchlets tomentose. Leaves 11 x 6 cm, ovate, acute at apex, rounded at base, crenate, hairy along nerves; petiole 1-3 cm long. Racemes panicled, terminal and axillary; bracts 3 mm long, ovate, small. Flowers closely packed; pedicellate; calyx 6 mm long, lobed near the apex, lobes equal, acute, hairy; corolla yellow to white, 11 mm long, upper lip absent, lower lip 3-lobed, lateral lobes smaller; stamens didynamous, filaments glabrous; anthers reniform; style filiform, stigma bifid. Nutlets 4, basely united, globular, reticulately pitted, glandular.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Glenmorgan.

52. LAURACEAE

1. Flowers unisexual, aggregated in umbels; anthers introse **2**
1. Flowers bisexual, aggregated in spikes or panicles; anthers extrose or introse **4**

2. Umbels sessile, perianth 4-merous; fertile stamens 6; staminodes 6 .... ***Neolitsea***
2. Umbels pedicellate, perianth 3-merous; fertile stamens 9-20; staminodes more than 20 .... **3**

3. Flowers in umbels or fascicles, covered by imbricating, caducous bracts; fertile stamens 9 .... ***Actinodaphne***
3. Flowers umbellate covered by involucral bracts; fertile stamens 9-12 .... ***Litsea***

4. Anthers 2-celled **5**
4. Anthers 4-celled **7**

5. Fruit surrounded by the enlarged perianth tube .... ***Cryptocarya***
5. Fruit not surrounded by the enlarged perianth tube **6**

6. Fruiting perianth persistent .... ***Apollonias***
6. Fruiting perianth deciduous .... ***Beilschmiedia***

7. Leaves 3-ribbed from the base or or just above from the base, opposite or subopposite .... ***Cinnamomum***
7. Leaves penninerved, alternate .... ***Phoebe***

ACTINODAPHNE Nees

1. Leaves comparatively small, more or less glaucous beneath, whorled **2**
1. Leaves comparatively large, more than 15 cm long, chartaceous **3**

2. Fruiting perianth with persistent lobes ..... ***A. salicina***
2. Fruiting perianth with deciduous lobes ..... ***A. campanulata***

3. Leaves with the lowest pair of main nerves usually opposite ..... ***A. bourneae***
3. Leaves penninerved, the lowest pair not opposite **4**

4. Leaves acuminate at both ends ..... ***A. bourdillonii***
4. Leaves obtuse or obtusely acute at apex, long cuneate at base ..... ***A. lawsonii***

316. Actinodaphne bourdillonii Gamble, Bull. Misc. Inform. Kew 1925: 129. 1925 & Gamble, Fl. Pres. Madras 1231(862). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 206.1987. **(PLATE 34: 294)**

Common names: Eeyoli, Malavirinji (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 10 m high, bark greyish-brown; blaze dull-yellow; branchlets densely tomentose. Leaves simple, opposite or subopposite, estipulate, in whorls of 7-10; petiole 10-20 mm long, stout, tomentose; lamina 11.5-26 x 3-8.3 cm, elliptic-lanceolate, oblong-lanceolate or oblanceolate, base acute or attenuate, apex acuminate, margin entire, glabrous above and softly grey or cinnamomeous-tomentose beneath, coriaceous; lateral nerves 7-9 pairs, pinnate, ascending about 20-300 from midrib, prominent, intercostae scalariform, prominent. Flowers unisexual, yellowish-green, small; male flowers: 8-10 together on peduncled umbels; pedicels to 6 mm long; bracts 12 x 8 mm orbicular; tepals 6, oblong, subequal; stamens 9, in 3 rows; filaments 2-glandular, densely hispid; anthers oblong, introrse; female flowers: 5-10 together in peduncled umbels on lateral tubercles; pedicels to 1.5 cm long, bracts imbricate, cauducous; tepals 6, subequal; staminodes 9, in 3 rows, those of the row 3 with 2-glands; ovary half inferior, ovoid, attenuate into the style; stigma dilated. Fruit a berry, 5 mm across, globose, black, smooth.

Flowering & Fruiting: April - August.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

317. Actinodaphne bourneae Gamble, Bull. Misc. Inform. Kew 1925: 128. 1925 & Gamble, Fl. Pres. Madras 1231 (861). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 206.1987. **(PLATE 34: 295)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Tree; branchlets and tender parts fulvous-tomentose. Leaves elliptic, rarely lanceolate or obovate-elliptic, to 12 x 5 cm, subcoriaceous, more densely fulvous-tomentose below, nerves 5-7 pairs, base cuneate or acute, apex acute to acuminate; petiole 2 cm. Flower cluster compact, of 3-6 flowers; pedicel 4 mm; bracts 5-8 x 4-6 mm, tawny-villous. Perianth yellowish, 5 mm wide; tube 4 mm, villous; lobes 6, ovate, 3 mm, densely villous outside. Staminate: stamens 9. Pistillate: staminodes 9. Berry globose.

Flowering & Fruiting: January - October.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Sispara.

318. Actinodaphne campanulata Hook. f., Fl. Brit. India 5: 148. 1886, var. **campanulata**; Gamble, Fl. Pres. Madras 1230 (861). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 206.1987. *Actinodaphne salicina* sensu Bedd., Fl. Sylv. t. 295. 1873, non Meisner 1864. **(PLATE 34: 296)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola margins.

Trees; young shoots densely brown tomentose. Leaves simple, in whorls of 3-8 or opposite or subopposite; petiole 5-13 mm long, stout, tomentose; lamina 4-6 x 1.5-3 cm long, obovate or elliptic-obovate, base acute or cuneate, apex obtuse, margin entire, pubescent above, glabrous and glaucous beneath, coriaceous, reticulate; lateral nerves 5-8 pairs, pinnate, slender, prominent, ascending at an angle of 200-300 from midrib; intercostae scalariform, faint. Flowers small, unisexual, yellowish-green, in lateral and axillary umbellate fascicles; bracts scaly, 2 mm long, ovate; perianth campanulate in female flowers, tube 0.1 cm long; lobes 6 in male flowers; ovate, silky brown hairy without; stamens 9 in 3 rows; filaments villous, 2 glandular; anthers introrse; staminodes 9, in 3 rows, those of the third row linear with 2 glands; ovary half inferior, 0.05 cm across, attenuate into the style; stigma dilated. Fruit a berry 0.4-0.6 cm across, with persistent perianth lobes.

Flowering & Fruiting: January - October.

Notes: Found in the ecotone region of sholas ± 2100 m, rare in Sispara.

319. Actinodaphne campanulata Hook.f. var. **obtusa** Gamble, Fl. Pres. Madras 1230(861). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 206.1987. **(PLATE 34: 297)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 8 m high; bark greyish-brown; blaze dull-yellow; young shoots glabrous or sparsely hairy. Leaves simple, 4-8 in a whorl, opposite or subopposite, estipulate; petiole 8-10 mm long, stout, glabrous; lamina 5.5-10 x 1.5-3 cm, elliptic, elliptic-lanceolate, base acute or cuneate, apex acute or obtuse, margin entire, glabrous, glaucous beneath, coriaceous; lateral nerves 5-11 pairs, pinnate, prominent, ascending at an angle of 300-400 from midrib; intercostae scalariform, faint. Flowers unisexual, yellowish-green, in lateral and axillary umbellate fascicles; pedicels 0.5-0.6 cm long; bracts 1 mm long; perianth; campanulate in female flowers; lobes 6 in male flowers; stamens 9, in 3 rows, filaments slender, 2-glandular; staminodes 9, in 3 rows, those of third row linear with 2-glands; ovary half inferior, minute, globose, attenuate into the style; stigma dilated. Fruit a berry, 0.5 cm across.

Flowering & Fruiting: February - June.

Notes: Found in the ecotone region of sholas ± 2000 m, rare in Sispara.

320. Actinodaphne lawsonii Gamble, Bull. Misc. Inform. Kew 1925: 129. 1925 & Gamble, Fl. Pres. Madras 1231 (862). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 206.1987. **(PLATE 34: 298)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 6 m high. Leaves simple, opposite or subopposite, whorled, estipulate; petiole 15-23 mm, stout, pubescent, grooved above; lamina 12-18 x 4-7.5 cm, obovate or elliptic obovate, base cuneate to attenuate, apex obtuse or obtusely acute; margin entire, glabrous above except at nerves, densely rufous tomentose beneath, coriaceous; lateral nerves 8-10, rufous tomentose, pinnate, intercostae scalariform, faint. Flowers unisexual, greenish, in 6-8 flowered clusters, rufous tomentose; pedicels 1 cm long; perianth tube short; lobes 6, subequal; stamens 9, in 3 rows; filaments 2-glandular; anthers 4-celled, introrse; staminodes 9, in 3 rows, those of row 3 linear and 2-glandular; ovary half inferior, ovoid; stigma dialated. Fruit a berry, resting on the enlarged perianth tube.

Flowering & Fruiting: February - August.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

321. Actinodaphne salicina Meisner in DC., Prodr. 15: 212. 1864; Hook. f., Fl. Brit. India 5: 148. 1886; Gamble, Fl. Pres. Madras 1230 (861). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 206.1987. **(PLATE 35: 299)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small trees or large shrubs; branchlets slender, glabrous. Leaves to 8.5 x 2.5 cm, narrowly elliptic or oblanceolate, attenuate at the base, membranous, glaucous beneath; nerves 8-12 pairs, parallel; intercostae, densely and minutely reticulate; petiole to 6 mm long. Flowers clustered; perianth 6-lobed. Fruits globose 7 mm across.

Flowering & Fruiting: September - March.

Notes: A typical shola trees ± 2050 m, common in Sispara.

APOLLONIAS Nees

322. Apollonias arnottii Nees, Syst. Laurin. 670. 1836; Hook. f., Fl. Brit. India 5: 121. 1886; Gamble, Fl. Pres. Madras 1219 (854). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 207.1987. **(PLATE 35: 300)**

Common names: Chenthanam, Chulunthu, Karamavu (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 12 m high; young shoots glabrescent. Leaves simple, scattered near the end of branchlets or alternate spiral, estipulate; petiole 5-18 mm long, slender, grooved above, glabrous; lamina 5-16 x 1.4-4 cm, elliptic, elliptic-lanceolate or narrowly lanceolate, base attenuate or acute, apex acuminate or caudate-acuminate, margin entire, pubescent on both sides when young, glabrous on ageing, coriaceous; lateral nerves 5-13 pairs, pinnate, ascending, prominent, intercostae reticulate, prominent. Flowers bisexual, yellowish, small, 3-4 mm long, in axillary or subterminal racemose panicles of 2.5-5 cm long; peduncle and the pedicels slender; bracts and bracteoles minute; perianth tube short; lobes 6, subequal, in 2 rows; stamens 9 perfect, those of the first and second rows introrse, opposite the perianth lobes, those of the third row opposite the first and extrorse with a pair of stalked glands at the base; ovary half inferior, sessile, 1-celled; ovule 1, pendulous; style curved; stigma depressed capitate. Fruit a drupe, 10-12 mm long, ovoid, pale green, seated on enlarged perianth lobes.

Flowering & Fruiting: November - December.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

BEILSCHMIEDIA Nees

323. Beilschmiedia wightii (Nees) Benth. ex Hook. f., Fl. Brit. India 5: 124. 1886; Gamble, Fl. Pres. Madras 1221(855). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 207.1987. *Haasia wightii* Nees, Syst. Laurin. 676. 1836. **(PLATE 35: 301)**

Common names: Nagaramaram, Panthada (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 25 m high, bark 14-16 mm thick, surface brown, smooth; blaze dull yellow with white streak, branchlets glabrous. Leaf-buds elongate, perulate with lanceolate scales. Leaves simple, alternate and opposite, estipulate; petiole 10-25 mm, stout, glabrous; lamina 7.5-15 x 2-6.2 cm, elliptic, elliptic-ovate, elliptic-oblong or elliptic-lanceolate, base acute or alternate, apex obtusely acuminate, margin entire, glabrous, shining, coriaceous; lateral nerves 8-10 pairs, pinnate, prominent, intercostae reticulate, prominent; surface areolate. Flowers bisexual, greenish-yellow, in axillary and terminal, glabrous panicles, small, ebracteate; peduncle and pedicel slender; perianth tube short, lobes 6, 3+3 subequal; stamens 9 perfect, in 3 rows, those of the 2 outer series with eglandular filaments and introrse anthers, those of the third series with 2 glandular filaments and extrorse anthers; staminodes 3, of fourth series cordate or ovoid, stipitate; glands 6, stipitate, as large as staminodes, between the second and third row of stamens; ovary half inferior, ovoid, glabrous; style slender, stigma subcapitate or obtuse. Fruit a berry 17-18 mm long, ovoid, smooth, purple.

Flowering & Fruiting: January - February.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Sispara.

KNS, Dodabetta, 25.02.1977, 6759 (FRC);

CINNAMOMUM Schaeffer

1. Leaves glabrous; inflorescence fulvous tomentose .... *C. wightii*
1. Leaves hairy, yellowish pubescent beneath; flowers yellowish-tawny tomentose .... *C. sulphuratum*

324. Cinnamomum sulphuratum Nees in Wall., Pl. Asiat. Rar. 2: 74. 1831; Hook.f., Fl. Brit. India 5: 132. 1886; Gamble, Fl. Pres. Madras 1225 (857). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 208.1987. **(PLATE 35: 302)**

Common names: Kadukankuttalae, Dalchini, Pinga dalchinni, Matta dalchinni (K); Kattukaruva (M).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Trees, to 8 m high; branchlets slender, angular, densely, minute sub-appressed, yellow, fulvous, pilose. Leaves simple, opposite or sub-opposite, estipulate; lamina 4-21 x 2-9 cm, elliptic, elliptic-ovate, elliptic-lanceolate or elliptic-oblong, base acute obtuse or shortly cuneate, apex acute or obtusely acuminate or acuminate, margin entire, glabrous and glossy above, glaucous and yellowish pubescent beneath, coriaceous. Flowers bisexual, in axillary or terminal lax, yellow fulvous pilose panicles; perianth tube 1-1.5 mm long, densely yellow pilose on both sides; tepals 6, 2-4 mm long, ovate, acute, yellow pilose on both sides. Stamens 9 perfect, those of first and second rows opposite the perianth lobes, introrse and eglandular, those of third row opposite the first row, lateral, bearing 2 large glands at the base; staminodes 3, of the forth row opposite the second row, narrowly sagitate, stipitate, pilose. Ovary half inferior, ellipsoid, as long as the style, stigma minute, peltate. Fruit a berry, 1 x 1.5 cm, cup-shaped; at the rim bears hard end, appressed-pilose, ovate, tepals; base of the cup fleshy, obconic, slightly merging into slender pedicel.

Flowering & Fruiting: March- April.

Utility: Used in Folk medicine. The aromatic leaves and barks are substituted or adulterated with the commercial cinnamon.

Notes: The destructive collection posses a serious threat to the existing wild populations of this endemic species, is of a major conservation concern. The Red listed status of this endemic species is Vulnerable for Karnataka, Kerala and Tamil Nadu. Found in the ecotone region of sholas and grasslands ± 2050 m, common in Ankinda.

325. Cinnamomum wightii Meisner in DC., Prodr. 15: 11. 1864; Hook. f., Fl. Brit. India 5: 132. 1886; Gamble, Fl. Pres. Madras 1224 (857). 1925; Fyson, Fl. South Indian Hill St. 3: t. 476. 1920; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 209.1987. **(PLATE 35: 303)**

Common names: Kattukaruva, Shanthamaram, Vellakodala (M); Karimoram (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees. Leaves simple, opposite or spirally arranged; lamina 3.5-20 x 2.5-7.5 cm, elliptic, ovate, elliptic-ovate or elliptic-oblong, base cuneate, slightly decurrent, apex obtusely

acute or obtusely shortly acuminate, margin entire, glabrous, glossy above, pale, subglaucous, smooth or obscurely, minutely pitted beneath, coriaceous. Flowers bisexual, 5-6 mm long, densely fulvous-sericeous, in axillary and pseudo-terminal, short and compact but long peduncled panicle of 10-14 cm long; branchlets few upto 1 cm, densely, minutely adpressed fulvous pilose; perianth tube 1 m long, funnel shaped. Tepals 6, 3-5 mm long, thick, ovate to oblong-ovate, acute. Stamens 9 perfect, in 3 rows, those of first and second row opposite the perianth lobes, introrse and eglandular, those of third row opposite the first row, extrorse bearing large stipitate glands as long as filaments; staminodes of fourth row opposite the second row, narrowly sagittate, pilose, stipitate, almost as long as the stamens. Ovary ellipsoid, half inferior; style as long with minute, peltate stigma. Fruit a berry, upto 1 x 1.5 cm, ellipsoid.

Flowering & Fruiting: April - June.

Utility: Used in Ayurveda and Siddha medicine. Bark, leaf, oil are of great medicinal application in gynecological, abdominal and paralytic disorders.

Propagation: Germination of seeds is 20%. After the flushing of 2 to 3 pairs of leaves, the seedling are ready for pricking out. Straight rooted seedlings are carefully pricked out and the root of the seedlings are dipped in Phosphobacterium and *Azospirillum* bio-nutrient mixture for 20 minutes. The seedlings are then transplanted to the growing medium in polythene bags containing sieved shola soil, sand and farmyard manure. DAP and neem cake powder solution is added for better growth. Seed viability is less than one month.

Notes: A typical shola tree ± 2200 m, common in Pykara. The Red listed status of this endemic species is Endangered for Karnataka, Kerala and Tamil Nadu.

PSU & NKK, Naduvattam, 06.02.1991, III a 35 (Cairn Hills); PSU & NKK, Kodanad, 05.07.1994, 523 & 31.08.1994, 150 (TNFDH).

CRYPTOCARYA R. Br.

1. Flowers in spreading terminal or axillary panicles; berry 4 cm long, lenticellate ...... ***C. lawsonii***
1. Flowers in short congested axillary or terminal tawny-tomentose panicles; berry 1 cm long, black .... ***C. neilgherrensis***

326. Cryptocarya lawsonii Gamble, Bull. Misc. Inform. Kew 1925: 127. 1925 & Gamble, Fl. Pres. Madras 1218(853). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 209.1987. **(PLATE 35: 304)**

Common names: Chembalamaram (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Lofty trees; branchlets glabrous lenticellate, black. Leaves simple, alternate, estipulate; petiole 10-12 mm long, stout, glabrous; lamina 7-12.5 x 2.5-5 cm, elliptic, elliptic-oblong, oblong or oblong-lanceolate, base acute, apex obtuse, emarginate or somewhat acute, margin entire, glabrous, purple-glaucous beneath, coriaceous; lateral nerves 6-8 pairs, pinnate, prominent, intercostae scalariform, faint; reticulations areolate. Flowers bisexual, minute, in terminal and axillary panicles of 9 cm long; peduncle and pedicel slender, slightly fulvous-pubescent; bract and bracteoles small, soon deciduous; perianth tube ultimately narrowed at the top; lobes 6 in 2 rows, subequal; stamens 9 perfect, in 3 rows, those of the 2 outer series with eglandular filaments and introrse anthers, those of the third series with 2 glandular filaments and extrorse anthers; those of the fourth series replaced by 3 stipitate staminodes; connective often produced, of second and third series obtuse; anthers 2-celled; ovary half inferior, sessile, enclosed in the tube; style short, exserted. Fruit a drupe 30-37 x 15-18 mm, ovoid, black, longitudinally ribbed.

Flowering & Fruiting: April - June.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Sispara.

327. Cryptocarya neilgherrensis Meisner in DC., Prodr. 15:71.1864; Gamble, Fl. Pres. Madras 1219(853). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 209.1987. **(PLATE 35: 305)**

Distribution: Peninsular India. *Habitat*: Shola forests.

Evergreen trees, to 10 m high; bark greyish-brown, smooth; blaze dull yellow; branchlets fulvous-tomentose and lenticellate. Leaves simple, alternate, estipulate; petiole 7-15 mm long, stout, pubescent; lamina 6-10.5 x 2.5-5.5 cm, elliptic-obovate, elliptic or ovate-oblong, base acute, apex acuminate, acute, margin entire, recurved, glabrous above, pubescent and glaucous beneath, coriaceous; lateral nerves 5-10 pairs, pinnate, prominent, intercostae scalariform, prominent. Flowers bisexual, in short congested axillary or terminal fulvous tomentose panicles of 5-10 cm wide; pedicels to 0.5 cm; perianth pubescent, tube ultimately narrowed at the top; lobes 6 4 mm, ovate, pubescent, subequal, in 2 rows; stamens 9 perfect, in 3 rows, those of the 2 outer series with eglandular filaments and introrse anthers, those of the third series with 2 glandular filaments and extrorse anthers; those of the fourth series replaced

by 3 stipitate staminodes; filaments hairy; anthers 2-celled; connective often produced; ovary half inferior, globose, 2 mm across, glaucous, sessile, enclosed in the tube; style short, exserted. Fruit a berry, ovoid, black.

Flowering & Fruiting: October – April.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

LITSEA Lam.

1. Perianth lobes incomplete or zero, deciduous, not enlarging in fruit .... ***L. quinqueflora***
1. Perianth lobes complete, persistent an enlarging in fruit **2**

2. Leaves elliptic-lanceolate; berry oblong-ellipsoid **3**
2. Leaves obovate or oblong; berry depressed globose .... ***L. wightiana***

3. Perianth lobes 6, stamens 12 .... ***L. myristicaefolia***
3. Perianth lobes 6 or 9, stamens 12 or 15 .... ***L. floribunda***

328. Litsea floribunda (Blume) Gamble, Fl. Pres. Madras 1238 (867). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 210.1987. *Cylicodaphne floribunda* Blume, Mus. Bot. Lugd.-Bat. 1: 387. 1851. *Litsea wightiana* Hook. f., Fl. Brit. India 5: 177. 1886. **(PLATE 35: 306)**

Common names: Mangal naika, Hollanigae (K); Pattuthali (M).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Dioecious trees, to 15 high, bark 8-10 mm thick, light brown, smooth, brittle, lenticellate; lenticels horizontal; blaze dull yellow; branchlets brown to black pubescent. Leaves simple, alternate, estipulate; petiole 10-15 mm long, stout, pubescent; lamina 7.5-28 x 3.7-10.5 cm, elliptic, obovate-oblong, elliptic-oblong or ovate-oblong, base acute, apex acute, or acuminate, margin entire, glabrous above except midrib above and rusty tomentose beneath, coriaceous; lateral nerves 10-15 pairs, pinnate, prominent; intercostae subscalariform, prominent. Flowers unisexual, in axillary racemose umbellule; peduncle upto 1 mm long, silky pubescent; bracts 4, orbicular, silky tomentose; flowers 6-8 in an umbellule. Perianth tube turbinate, silky tomentose, lobes 6. Stamens 12, in 4 rows; filaments hairy, those of rows 1 and 2 usually eglandular, those of rows 3 and 4 with 2-glands; anthers 4-celled, introrse. Staminodes in female flowers as the stamens of males but those of the outer rows clavate or linear, those of the inner rows subulate and 2 glandular. Ovary half inferior, stigma capitate. Fruit a berry, 12-18 mm long, oblong, seated on a turbinate perianth tube.

Flowering & Fruiting: December - April.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

KNS, Kodanad, 21.04.1964, 1238 (FRC).

329. Litsea myristicaefolia (Wall. ex Nees) Hook.f., Fl. Brit. India 5: 172. 1886. *Cylicodaphne myristicaefolia* (Wall. ex Nees) Meisner in DC., Prodr. 15: 208. 1864. *Lepidadenia griffithii* Wight, Ic. t. 1846. 1852. **(PLATE 35: 307)**

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Dioecious trees. Leaves simple, alternate, estipulate; petiole 10-15 mm long, stout, glabrous; lamina 8-12 ×2-4.5 cm, elliptic-oblong or lanceolate, base attenuate, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves 11-12, pinnate, prominent, intercostae reticulate, prominent. Flowers unisexual, yellowish, in globose umbellules clustered in axillary and subterminal subracemes; peduncles 1-2 mm long; pedicels 5-6 mm long; bracts 4-6, concave, glabrous; perianth lobes 6; stamens 12, in 4 rows; filaments of rows 1 and 2 eglandular, those of rows 3 and 4 with 2 glands; staminodes in female as the stamens of male, but those of inner rows subulate and 2-glandular; ovary half inferior, globose. Fruit a berry.

Flowering & Fruiting: May - August.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

330. Litsea quinqueflora (Dennst.) Suresh in Nicolson et al., Interpr. Hort. Malab. 158. 1988. *Darwinia quinqueflora* Dennst., Schluss. Hort. Malab. 12, 20, 31. 1818. *Tetranthera ligustrina* Nees in Wall., Pl. Asiat. Rar. 2: 65. 1831. *Litsea ligustrina* (Nees) Hook.f., Fl. Brit. India 5: 158. 1886; Gamble, Fl. Pres. Madras 1235 (864). 1925; Fyson, Fl. South Indian Hill St. 3: t. 478. 1920; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 210.1987. *Actinodaphne quinqueflora* (Dennst.) M.R.Almeida & S.M.Almeida, J. Bombay Nat. Hist. Soc. 90: 425. 1993. **(PLATE 36: 308)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small trees; branchlets densely tomentose. Leaves to 20 x 9 cm, obovate, obtuse at apex, acute to the base; nerves 9-11 pairs, reticulate; petiole 2.5 cm long. Peduncle 1.5-2 cm long. Umbellules 10-20 mm across; bracts orbicular, densely tomentose outside. Flowers to 25 in an umbellule, pedicels 4 mm long; perianth lobes 3-5 or absent, 2 mm long, densely hairy; stamens 25-30, filaments bearded.

Flowering & Fruiting: April - May.

Propagation: The seeds are viable for a month. The matured black coloured fruits are immersed in water for overnight, depulped, dried and then sown in the well prepared mother bed with rooting medium containing red soil and sand at the ratio of 1:1. Germination occurs between 20 and 30 days. Germination is of about 30%.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 29.01.1991, d 63 (Cairn Hills); PSU & NKK, Kodanad, 08.08.1994, 117 (TNFDH).

331. Litsea wightiana (Nees) Hook. f. in Benth. & Hook. f., Gen. Pl. 3: 162. 1880,p.p, var. **wightiana**; Gamble, Fl. Pres. Madras 1238(866). 1925; Fyson, Fl. South Indian Hill St. 3: t. 477. 1920; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 211.1987. *Cylicodaphne wightiana* Nees in Wall., Pl. Asiat. Rar. 2: 68. 1831. **(PLATE 36: 309, 309 a)**

Common names: Pattuthali, Manjakudala (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Large trees. Leaves to 11 x 4 cm, elliptic-lanceolate, acute, cuneate at base, coriaceous, reddish brown beneath, tomentose, later becomes glabrous; nerves ca. 8 pairs, transverse nervules faint, margins thick; petiole to 2 cm. Racemes axillary, to 7 cm; umbellules 8 mm across, globose, ferrugineus, tomentose.

Flowering & Fruiting: March - July.

Propagation: Seeds can be stored from 15 days to 1 month. The matured black colour fruits are soaked in water depulped, dried and sown in prepared mother bed for germination. The mother beds treated with Neem cake powder with appropriate rooting medium is used for good germination. The germination is of about 40%.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 27.01.1991, d 65 (Cairn Hills); PSU & NKK, Kodanad, 17.08.1994, 122 (TNFDH); KNS, Longwood, 08.05.1963, 489 (FRC).

NEOLITSEA (Benth.) Merr.

1. Berry oblong .... *N. cassia*
1. Berry globose .... *N. scrobiculata*

332. Neolitsea cassia (L.) Kosterm., J. Sci. Res.(Jakarta) 1: 85. 1952; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 211.1987. *Laurus cassia* L., Sp. Pl. 369. 1753. *Neolitsea zeylanica* (Nees) Merr., Philipp. J. Sci. Suppl. 1: 57. 1906; Gamble, Fl. Pres. Madras 1239(867). 1925; Fyson, Fl. South Indian Hill St. 3: t. 479. 1920. *Litsea zeylanica* Nees, Amoen. Bot. Benn. Fasc. 1: 58. t.5. 1823; Hook. f., Fl. Brit. India 5: 178. 1886. **(PLATE 36: 310, 310a)**

Common names: Keezhambazham, Pravari, Venkana, Vellakodala (M); Molagashembaga-palei (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Deciduous trees, to 18, bark 8-10 mm thick, grey, rough, brittle; blaze creamy yellow turning to yellowish-brown, inner surface slimy to touch. Leaves simple, alternate, opposite or in whorls; petiole 10-15 mm, elliptic, elliptic-lanceolate or oblong-lanceolate, base acute or attenuate, apex acute, margin entire, glabrous above and glaucous beneath; reticulation areolate, coriaceous; 3-ribbed near the base, faint; lateral nerves 1-4 pairs, pinnate, very faint; intercostae scalariform, faint. Flowers unisexual, yellowish-green, densely seriaceous, in sessile umbels on extremely short branchlets at internodes; bracts 5 mm long, orbicular, concave, seriaceous, rather thin. Tepals 4, 2-3 mm long, narrowly ovate or oblong, acute. Stamens 6, in 3 rows; those of 2 outer rows eglandular, those of the inner row biglandular opposite the first row; filaments 4-5 mm long, greenish-yellow, thread-like, glabrous; anthers 0.5 mm long, introrse. Ovary half inferior, ovoid; style long; stigma large peltate; staminodes 6, in 3 rows. Fruit a drupe 10-12 mm across, globose, seated on disc like, crenate perianth cup of 5 mm diameter; pedicel slender.

Flowering & Fruiting: March - April.

Utility: Used in Folk medicine. Root and bark applied to eruptions.

Propagation: The blue coloured fruits are soaked in water for overnight and then depulped.Then depulped white coloured seeds are sown in well prepared mother beds. Germination is noticed from 55 to 60 days. Germination is of about 40 percent.

Notes: Found in the ecotone region of sholas ± 1750 m, common in Thaishola.

PSU & NKK, Kinnakorai, 18.02.1991, d 66 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 106 (TNFDH); KNS, Cairon hill, 18.03.1969, 3671 (FRC).

333. Neolitsea scrobiculata (Meisner) Gamble, Fl. Pres. Madras 1240 (868). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 212.1987. *Litsea scrobiculata* Meisner in DC., Prodr. 15: 223. 1864. *Litsea zeylanica* sensu Hook. f., Fl. Brit. India 5: 178. 1886 p.p., non Nees 1823. **(PLATE 36: 311)**

Common names: Neervotte, Dodda dalchini (K); Mulakunari, Shanthamaram, Vellatan (M).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Evergreen trees, to 15 m high; bark grey, smooth; blaze dull yellow; branchlets glabrous, black. Leaves simple, alternate subopposite or in whorls, estipulate; petiole 15-25 mm long, slender, glabrous; lamina 5-11 x 2.5-6 cm, elliptic-ovate or ovate, base acute or attenuate, apex obtusely acute or acuminate, margin entire, glabrous above, glaucous beneath, densely scrobiculate, coriaceous; 3-ribbed from base; lateral nerves 2-3 pairs, pinnate, faint, intercostae scalariform, faint. Flowers unisexual, 3-8 in axillary, subsessile umbellules; involucral bracts 4, concave, naviculate, deciduous. Male flowers: 5 mm across, tepals 4, stamens 6 in 3 whorls of 2 each, those of the 2 outer rows eglandular, those of the inner row biglandular opposite the first row; filaments to 0.5 mm; anthers 4-celled, 1 m, upper cells introrse, lower lateral; pistillode linear, to 1.5 mm. Female flowers: 6 m across; tepals 4, free, lanceolate, 3 mm, acute; ovary 7 x 5 mm, half inferior, globose; style 2 mm; stigma discoid; staminodes 6, in 3 series, first and second whorl linear, third whorl of stalked staminodes with 2-lobed sterile anthers. Fruit a drupe 8 mm across, globose, with a basal rim of perianth tube; epicarp fleshy, crinkled, brownish-black when dry; seed 6 m across, globose.

Flowering & Fruiting: May - August.

Utility: Used in Folk and Siddha medicine. Fruit oil is used for itches and skin diseases.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Parsons valley.

PHOEBE Nees

334. Phoebe wightii Meisner in DC., Prodr. 15: 38. 1864; Gamble, Fl. Pres. Madras 1228 (860). 1925; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 212.1987. *Phoebe paniculata* Hook.f., Fl. Brit. India 5: 142. 1886, non Nees 1836. **(PLATE 36: 312)**

Common names: Karamara (K); Chudala, Mulakunari (M); Sudalan (T).

Distribution: Peninsular India. *Habitat*: Shola forests.

Evergreen trees, to 10 m high; bark brown, smooth; young parts rusty, pubescent. Leaves simple, alternate, estipulate, crowded at the tips of branchlets; petiole 7-15 mm long, stout, rusty pubescent when young; lamina 7.5-15 x 3-6 cm, elliptic, obovate or elliptic-obovate, base cuneate, apex acuminate, margin entire, glabrous above, rusty tomentose beneath, coriaceous; lateral nerves 6-7 pairs, pinnate, prominent, intercostae scalariform, faint. Flowers bisexual, yellowish-green, in axillary and lateral lax pubescent panicles; pedicel 5 mm. Perianth tube short; lobes 6, 3-4.5 mm, subequal, ovate, tomentose. Stamens 9 perfect, in 3 rows, those of first and second row introrse eglandular, those of third row extrorse with 2 large stipitate glands at their base; staminodes of the fourth row cordate, stipitate; anthers 4-celled. Ovary half inferior, sessile, 1 mm, globose, pubescent, style 2 mm, stigma simple. Fruit a drupe, globose, 1 cm across; perianth lobes persistent, cupular, erect; epicarp fleshy; seed confirm to the fruit.

Flowering & Fruiting: April - May.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Glenmorgan, 27.01.1991, d 67 (Cairn Hills); PSU & NKK, Kodanad, 22.03.1994, 25 & 20.07.1994, 253 (TNFDH); KNS, Longwood, 08.05.1963, 477 (FRC).

53. LENTIBULARIACEAE

UTRICULARIA L.

1. Bracts basifixed, corolla yellow .... ***U. scandens***
1. Bracts medifixed, corolla purple .... ***U. caerulea***

335. Utricularia caerulea L., Sp. Pl. 18. 1753; Gamble, Fl. Pres. Madras 983 (691). 1924; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 129.1987; Fyson, Fl. South Indian Hill St. 2: t. 203. 1932; M.K. Janarth. & Henry, Bladderworts India 43. 1992. **(PLATE 36: 313)**

Distribution: Paleotropics. *Habitat*: Marshy areas.

Terrestrial herbs; rhizoids upto 2.5 cm long; stolons capillary, upto 2 cm long. Foliar organs upto 1 cm long, narrowly obovate, rosulate, apex rounded. Traps numerous 1-1.5 mm long, ovoid, stalked. Racemes 2.5-6 cm long, terete; scales similar to the

bracts; bracts 1.5-3 mm long, narrowly elliptic, acute at both ends; bracteoles 1-2 mm long. Flowers up to 4 mm long; pedicels ca 1.5 mm long, often recurved in fruit. Calyx-lobes subequal, ca 1.5 mm long, ovate, hooded. Corolla purple or cream; upper lip 2-lobed, ca 2 mm long, obovate to oblong, notched or emarginate at apex; lower lip 2-3 mm long, suborbicular to broadly ovate; spur 3-4 mm long, slightly curved forwards. Stamens 2; filaments ca mm long. Ovary ovoid; stigma 2-lipped. Capsules 1.5-2 mm across, subglobose. Seeds ovoid or ellipsoid, reticulate.

Flowering & Fruiting: August - October.

Notes: Found in the marshy region of sholas ± 2050 m, common in Pykara falls.

PSU & NKK, Kodanad, 28.09.1995, 337 (TNFDH).

336. Utricularia scandens Benj., Linnaea 20: 309. 1847; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 131.1987; M.K. Janarth. & Henry, Bladderworts India 97. 1992. *Utricularia wallichiana* Wight, Ic. t. 1572. f. 1. 1850, non Bery 1845; Hook. f., Fl. Brit. India 4: 332. 1884; Gamble, Fl. Pres. Madras 982 (690). 1924; Fyson, Fl. South Indian Hill St. 2: t. 204. 1932. **(PLATE 36: 314)**

Distribution: Paleotropics. *Habitat*: Marshy areas.

Herbs. Foliar organs linear, nerved, 1 cm long; trap globose, mouth basal, appendages 2, subulate. Racemes up to 20 cm long, twining; bracts basifixed, ovate-acuminate. Flowers yellow. Calyx lobes unequal, upper lobes ovate, acuminate, 3.5 x 2 mm, lower lobe 2.8 x 2 mm, ovate, bidentate. Corolla: upper lip 2.5 x 1.5 mm, obovate, shallowly emarginate, lower lip 3 x 2.5 mm, orbicular, hairy in throat; spur 3 mm long, conical, acute. Capsule ovoid, dehiscent; margins thickened; seeds ovoid to ellipsoid, testa reticulate, cells elongated.

Flowering & Fruiting: October - December.

Notes: Found in the marshy region of sholas ± 2050 m, common in Pykara falls.

PSU & NKK, Pykara, 16.03.1991, c 50 (Cairn Hills); PSU & NKK, Kodanad, 17.08.1994, 130 (TNFDH); KNS, Kodanad, 07.05.1962, 422 (FRC).

54. LILIACEAE

1. Leaves minute with spinescent scales, bearing axillary cladodes .... *Asparagus*
1. Leaves prominent **2**

2. Flowers trumpet-shaped, large, 13 cm long, solitary .... *Lilium*
2. Flowers less than 5 cm long, in racemes or umbels **3**

3. Tuberous herbs with rosette of linear leaves, nerves not prominent .... *Chlorophytum*
3. Erect herbs with prominent elliptic- lanceolate, 3-nerved leaves .... *Disporum*

ASPARAGUS L.

337. Asparagus fysonii Macbr., Contr. Gray Herb., n.s. 56: 17. 1918; Gamble, Fl. Pres. Madras 1517 (1059). 1928; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 38.1989. *Asparagus subulatus* Steud. ex Baker, J. Linn. Soc. Bot. 14: 614. 1875, nom. illeg.; Hook. f., Fl. Brit. India 6: 315. 1892; Fyson, Fl. South Indian Hill St. 2: t. 262. 1932. *Protasparagus fysonii* (Macbr.) Kamble, Journ. Econ. Tax. Bot. 15: 709. 1991 & 21: 169. 1997. **(PLATE 37: 315)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Climbing shrubs; stem erect, tall, smooth; branchlets grooved; spines straight, long; cladodes 4-12-nate, triquetrous, acuminate, 1.6-3.5 cm long. Leaves reduced to minute, distinctly spinous. Flowers white, small or minute, 1-2 together, solitary, clustered or umbelled, not racemed, pedicels jointed above the middle. Perianth petaloid, campanulate, 6-partite. Stamens 6, on the bases of the perianth-segments; filaments free; anthers oblong. Ovary 3-celled, 3-gonous; ovules 2 or more in each cell; style 1, columnar; stigmas 3. Fruit a globose, pulpy berry; seeds 1-6, testa black, brittle; embryo dorsal.

Flowering & Fruiting: March - July.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Longwood.

PSU & NKK, Kodanad, 20.10.1994, 203 (TNFDH).

CHLOROPHYTUM Ker-Gawler

338. Chlorophytum malabaricum Baker, J. Linn. Soc. Bot. 15: 331. 1876; Hook. f., Fl. Brit. India 6: 335. 1892; Gamble, Fl. Pres. Madras 1526 (1066). 1928; Fyson, Fl. South Indian Hill St. 2: t. 263. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 39.1989. **(PLATE 37: 316)**

Distribution: Peninsular India. *Habitat:* Grasslands.

Tuberous herbs. Leaves 14-20 x 1.5 cm, linear, apex obtuse, subacute. Scape terminal to 3, racemes simple or paniculate, to 15 cm. Racemes lax, paired, often solitary;

bracts 8 mm, lanceolate; bracteole 3 mm, linear, 4.5 x 0.5 mm, pedicel, 6 mm joined. Flowers ca. 3 cm across, perianth lobes oblong, subequal, white; stamens 6, to 3 mm; ovary 6-lobed. Capsule 6 mm across, globose, 3-winged; seeds ca 3 x 2 mm, ovoid.

Flowering & Fruiting: July- November.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Pykara.

DISPORUM Salisb. ex D. Don

339. Disporum leschenaultianum D. Don, Proc. Linn. Soc. London 1: 45. 1839; Hook. f., Fl. Brit. India 6: 360. 1892; Gamble, Fl. Pres. Madras 1522 (1063). 1928; Fyson, Fl. South Indian Hill St. 2: t. 264. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 40.1989. **(PLATE 37: 317)**

Distribution: Southern Western Ghats and Sri Lanka. *Habitat*: Shola forests.

Erect herbs. Leaves to 8 x 4 cm, ovate-lanceolate, rounded or cordate at base, 3-5 ribbed, sessile, usually clustered towards the apex. Flowers 3-6 together, in sessile umbel in the axils of upper leaves; pedicels 10 mm long, slender; perianth lobes 6, free, 10 x 5 mm, obovate, acute; stamens 6, free, filaments 3 mm long, broadened below; anthers oblong; ovary ovoid; ovules few; style stout; stigma 3-lobed, curved. Berry, 7 x 7 mm, globose; 1-seeded.

Flowering & Fruiting: June - July.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 27.02.1991, III b 1 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1995, 328 (TNFDH); KNS, Staircase shola, 24.05.1972, 4378 (FRC).

LILIUM L.

340. Lilium wallichianum Schult. & Schult. f. var. **neilgherrense** (Wight) Hara in Ohashi, Fl. East. Himal. 3: 132. 1975; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 40.1989. *Lilium neilgherrense* Wight, Ic. tt. 2031, 2032. 1853; Hook. f., Fl. Brit. India 6: 350. 1892; Fyson, Fl. South Indian Hill St. 3: t. 534. 1920; Gamble, Fl. Pres. Madras 1523 (1064). 1928. *Lilium tubiflorum* Wight, Ic. tt. 2033, 2034. 1853. **(PLATE 37: 318)**

Common names: Kuzhalpoovu, Thathapoovu, Thazhamboo (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Erect unbranched herbs; stem leafy, to 1.5 cm high. Leaves scattered, to 10 x 2 cm, lanceolate, sessile, acute at apex, glabrous. Flowers 1-3 together, terminal; pedicel 3 cm long, glabrous. Perianth 20 cm long, campanulate; lobes 6, ovate, acute, white, lower tubular; stamens 6, filaments 16 cm long, free; anthers linear-oblong, versatile; ovary oblong; ovules many; style to 16 cm long constricted at base; stigma globose or 3-toothed. Capsule 3-valved; seeds many, compressed.

Flowering & Fruiting: October - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1900 m, common in Valley view.

55. LINACEAE

LINUM L.

341. Linum mysorense Heyne ex Benth., Bot. Reg. 16: sub. t. 1326. 1830; Hook. f., Fl. Brit. India 1: 411. 1874; Gamble, Fl. Pres. Madras 125 (89). 1915; Fyson, Fl. South Indian Hill St. 2: t. 39. 1932; S.R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 47.1983; Hajra in B.D. Sharma & Sanjappa, Fl. India 3: 578. 1993. **(PLATE 37: 319)**

Common names: Kadu agase bija (K).

Distribution: Sri Lanka, India and Western Himalayas. *Habitat*: Grasslands.

Annual herbs, erect, usually unbranched. Leaves alternate, to 2 x 0.5 cm, elliptic, acute, glabrous, sessile. Flowers yellow, in terminal panicled cymes. Sepals 5, 3 x 1.5 mm, ovate, acute. Petals 2.5 x 1.5 mm, obovate, emarginate. Stamens 5, filaments united at base into a short tube, anthers ovate. Ovary 5-celled, depressed globose; ovule 1 in each cell; styles 5, free, 2 mm long. Fruit a dehiscent capsule, 3 mm across, depressed globose, glabrous; seeds many, 1 x 0.5 mm, biconvex.

Flowering & Fruiting: November - December.

Notes: Found in grasslands ± 2100 m, common in Mukurthi.

56. LOBELIACEAE

LOBELIA L.

342. Lobelia leschenaultiana (Presl) Skottsb., Acta Horti Gothob. 4: 4. f. 3-7. 1928; Haridasan & Mukh. in Nayar et al., Fasc. Fl. Ind. 19: 52. 1988; R. Chandras. in Henry et al., Fl. Tamil Nadu 2: 56.1987. *Rapuntium leschenaultianum* Presl, Prodr. Monogr. Lobel. 24. 1836. *Lobelia excelsa* Lesch. ex Wall. in Roxb., Fl. Ind. 2: 114. 1824; Hook. f., Fl. Brit. India 3: 427. 1881; Gamble, Fl. Pres. Madras 737 (518). 1921; Fyson, Fl. South Indian Hill St. 3: t. 403. 1920. *Lobelia beddomeana* Wimmer in Engl., Pflanzenr., Campanulac.-Lobel. II. 645. 1953. **(PLATE 37: 320)**

Common names: Wild Tobacco (E); Hethumbbae, Kadu hoge soppu, Kandele, Kaada-hogesoppu (K); Kattupukayila, Thonnali (M).

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Stout erect shrubs, usually unbranched. Leaves 15-25 x 3-6 cm, linear-elliptic, densely pubescent below, shortly and broadly petiolate. Racemes terminal, 25-60 cm long; bracts 2.5 cm long, linear, pubescent; flowers numerous, densely packed; pedicel pubescent; bracts 2.5 cm long, linear. Sepals 14 x 2 mm, linear, acuminate, serrate, pubescent. Corolla pale pink, 25 mm long, lobes linear. Staminal tube narrow, 2.5 cm long, anthers 7 mm long, all glabrous. Capsule 8 x 8 mm, depressed globose, scabrid; seeds biconvex, brown.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine. It is a rich source of alkaloids of the lobeline group and used as a substitute for *Lobelia inflata*. The leaves and seeds are considered to be poisonous. The root is reported to be used in the treatment of scorpion sting and also for treating eye disorders. The stem bark is used for toothache.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Naduvattam.

PSU & NKK, Naduvattam,06.02.1991, b 21 (Cairn Hills).

57. LOGANIACEAE

1. Plants wiry climbers; flowers yellow .... ***Gardneria***
1. Plants mostly epiphytic trees; flowers white, more than 6 cm across .... ***Fagraea***

FAGRAEA Thunb.

343. Fagraea ceilanica Thunb., Vetensk. Acad. Handl. 3: 132. 1782; Hook. f., Fl. Brit. India 4: 83. 1883 "zeylanica"; Gamble, Fl. Pres. Madras 865 (608). 1923; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 91.1987. *Fagraea obovata* Wall. in Roxb., Fl. Ind. 2: 33. 1824; Hook. f., Fl. Brit. India 4: 83. 1883; Gamble, Fl. Pres. Madras 865 (608). 1923; Fyson, Fl. South Indian Hill St. 3: t. 428. 1920. *Fagraea coromandelina* Wight, Ic. t. 1316. 1848. *Fagraea malabarica* Wight, Ic. t.1317. 1848. **(PLATE 37: 321)**

Common names: Lau binh, Gia, Perfume Flower Tree, Pua Keni, Trai Tichlan (E); Mulakkay, Ginnunnu (K); Kompal, Modakam, Modakakkodi, Marunthankamaram, Omal, Vallerei, Vellarimodakam (M); Kadelmodagom, Modagam (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Small trees, usually epiphytic on tree trunks; branchlets stout with prominent leaf-scars. Leaves 10-18 x 5-8 cm, obovate or oblanceolate, base cuneate, margin entire, apex obtuse, fleshy, shiny, glabrous; petiole to 2.5 cm long. Inflorescence terminal or axillary, few-flowered corymbose cymes. Flowers large, 6-8 cm across, creamy white. Calyx deeply 5-lobed; lobes ca 8 mm long, obovate, acute or obtuse. Corolla funnel-form; tube 4-5 cm long; lobes 5, broad, twisted to right. Stamens 5, adnate at base of corolla-tube. Ovary 2-celled; ovules many in each cell; stigma capitate. Berry 2-4 x 1.5-3 cm, ellipsoid, shiny. Seeds many.

Flowering & Fruiting: March - November.

Utility: Used in Folk medicine.

Notes: Found in all types of forests ± 2000 m, common in Kodanad.

PSU & NKK, Kodanad, 28.10.1994, 216 (TNFDH); KNS, Naduvattam, 14.05.1963, 284 (FRC).

GARDNERIA Wall.

344. Gardneria ovata Wall. in Roxb., Fl. Ind. 1: 400.1820; Hook. f., Fl. Brit. India 4: 93. 1883; Gamble, Fl. Pres. Madras 869 (611). 1923; Fyson, Fl. South Indian Hill St. 2: t. 192. 1932; M. Chandrabose in Henry et al., Fl. Tamil Nadu 2: 91.1987. *Gardneria wallichii* Wight ex Wall., Pl. Asiat. Rar.3: 49. t. 281. 1832. **(PLATE 37: 322)**

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Small glabrous climbers. Leaves to 10 x 5 cm, ovate, abruptly acuminate, acute at base, entire; nerves 4 or 5 pairs; petiole 1 cm long. Cymes axillary, 3-5-flowered, peduncled; bracts ovate, acute. Flowers pedicellate. Calyx shallowly 4-lobed, lobes obtuse; ciliate. Corolla orange-yellow, lobes 5 mm long, basely united, oblong, acute. Stamens 4, attached at the base of corolla lobes. Ovary 2-celled, glabrous; style subulate. Berry 7 x 6 mm, globose, blue; seeds 2, cup-shaped, with pulpy placenta on concave surface.

Flowering & Fruiting: February - May.

Notes: Found in the ecotone region of sholas ± 2000 m, common in Pykara.

KNS, Kodanad, 09.05.1963, 513 (FRC).

58. LORANTHACEAE

1. Flowers in elongated unilateral racemes .... ***Dendrophthoe***
1. Flowers in reduced cymes or capitate spikes **2**

2. Bracteoles 2 .... ***Macrosolen***
2. Bracteoles absent **3**

3. Corolla-lobes free .... ***Helixanthera***
3. Corolla-lobes united .... ***Taxillus***

DENDROPHTHOE Mart.

1. Flowers in racemes .... ***D. trigona***
1. Flowers in axillary fascicles or cymes **2**

2. Flowers solitary or very short peduncled cymes; berry obovoid .... ***D. neelgherrensis***
2. Flowers umbellate cymes; berry oblong .... ***D. memecylifolia***

345. Dendrophthoe memecylifolia (Wight & Arn.) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 1929; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 215.1987. *Loranthus memecylifolius* Wight & Arn., Prodr. 383. 1834; Hook. f., Fl. Brit. India 5: 217. 1886; Gamble, Fl. Pres. Madras 1254 (878). 1925; Fyson, Fl. South Indian Hill St. 3: t. 484. 1920.

Common names: Pulluruvi (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Parasitic on *Photinia*.

Glabrous parasitic shrubs; branches stout, terete, brown. Leaves opposite, up to 8 x 3 cm, coriaceous, opposite or alternate, oblong-lanceolate, acute, cuneate at base; the

nerves obscure; petioles very short. Flowers in axillary or lateral peduncled umbellate cymes; bracts cup-like but one-sided. Calyx-tube adnate to the ovary, the limb short, truncate or toothed; lobes triangular. Corolla gamopetalous, very straight, erect, scarlet coloured, glabrous without, with very rare exceptions, 2-4 cm long; lobes 5, valvate. Stamens 4; filaments much shorter than the anthers. Ovary 1-celled; style linear; stigma lateral. Berry oblong.

Flowering & Fruiting: February - June.

Notes: Parasitic on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Dodabetta, 11.02.1991, d 73 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 540 & 20.10.1995, 356 (TNFDH); KNS, Dodabetta, 08.02.1963, 34A (FRC).

346. Dendrophthoe neelgherrensis (Wight & Arn.) Tieghem, Bull. Soc. Bot. France 4: 252. 1895; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 215.1987. *Loranthus neelgherrensis* Wight & Arn., Prodr. 382. 1834; Hook. f., Fl. Brit. India 5: 216. 1886; Gamble, Fl. Pres. Madras 1254 (877). 1925; Fyson, Fl. South Indian Hill St. 2: t. 233. 1932. **(PLATE 37: 323)**

Common names: Pulluruvi (T).

Distribution: South India and Sri Lanka. *Habitat*: Parasitic on *Litsea*.

Large woody parasitic shrubs; branches transversally rugose, glabrous. Leaves 7-10 x 3.5 cm, obovate, obtuse, coriaceous, narrowed to the base; petiole to 7 mm long. Flowers 3-6 together in axillary cymes; peduncle 7 mm long, slender; bracts small, ovate; pedicel 3 mm long, puberulus. Calyx obscurely toothed. Corolla 15-20 mm long, yellow, cleft to below the middle, lobes recurved. Berry 7 x 4 mm, obovoid.

Flowering & Fruiting: March - July.

Notes: Parasitic on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 16.03.1991, d 69 (Cairn Hills); PSU & NKK, Kodanad, 11.09.1995, 313 (TNFDH); KNS, Coonoor, 19.03.1969, 3682 (FRC).

347. Dendrophthoe trigona (Wight & Arn.) Danser ex Sant., Rec. Bot. Surv. India 16:163. 1953; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 215.1987. *Loranthus trigonus* Wight & Arn., Prodr. 386. 1834; Hook. f., Fl. Brit. India 5: 219. 1886; Gamble, Fl. Pres. Madras 1253 (877). 1925. **(PLATE 38: 324)**

Distribution: Endemic to Western Ghats. *Habitat*: Parasitic on *Vaccinium*.

Parasitic shrubs; branches to 15 mm thick, rugose, glabrous. Leaves to 20 x 13 cm, ovate, obtuse, acute at base, coriaceous; petiole 1.5 cm long, flattened or winged. Racemes to 3 cm long; bracts cup shaped. Flowers pink. Calyx cupular, truncate, glabrous. Corolla 15-20 mm long, split to the middle. Berry 1 x 0.5 cm, obovoid.

Flowering & Fruiting: May - September.

Notes: Parasitic on shola trees ± 1800 m, common in Naduvattam.

HELIXANTHERA Lour.

348. Helixanthera obtusata (Schult.) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 317. 1929; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 216.1987. *Loranthus obtusatus* Schult. in Roem. & Schult., Syst. Veg. 7: 1650. 1830; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251 (876). 1925; Fyson, Fl. South Indian Hill St. 3: t. 481. 1920. **(PLATE 38: 325)**

Distribution: Endemic to Western Ghats. *Habitat*: Parasitic on *Litsea*.

Parasitic shrubs; branchlets terete, slender, ferrugineus-tomentose. Leaves to 14 x 8 cm, ovate, obtuse, base rounded, coriaceous, glabrous; petiole 1 cm long. Racemes to 8 cm long, densely golden tomentose; bracts with a small appendage. Flowers many; pedicel 5 mm long, reflexed. Corolla dark pink, 18 mm long, 4-angular and curved in bud, lobes 4, free, tomentose outside. Anthers dark brown. Stigma globose.

Flowering & Fruiting: April - June.

Notes: Parasitic on shola trees ± 1800 m, common in Naduvattam.

KNS, Kodanad, 21.04.1964, 1241(FRC).

MACROSOLEN (Bl.) Reichb.

349. Macrosolen parasiticus (L.) Danser, Blumea 2: 36. 1936; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 217.1987. *Lonicera parasitica* L., Sp. Pl. 175. 1753. *Loranthus loniceroides* L., Sp. Pl. (ed. 2) 473. 1762; Hook. f., Fl. Brit. India 5: 221. 1886; Fyson, Fl. South Indian Hill St. 2: t. 234. 1932. *Elytranthe loniceroides* (L.) G. Don, Gen. Hist. 3: 427. 1834; Gamble, Fl. Pres. Madras 1255 (879). 1925. **(PLATE 38: 326)**

Common names: Banje (K); Chempoo (M).

Distribution: South West India and Sri Lanka. *Habitat*: Parasitic on *Acacia melanoxylon*.

Parasitic shrubs; branches terete, glabrous. Leaves ovate-lanceolate, acuminate, rounded at base; nerves obscure; petiole 1.5 cm long. Peduncle 1 cm long, 1-6-flowered; bracteoles orbicular. Calyx 5 mm long, tubular, glabrous. Corolla scarlet below, white or green at apex, curved; lobes deflexed, divided to above the middle. Filaments green. Stigma hemispherical. Berry ovoid, smooth, crowned with tubular calyx.

Flowering & Fruiting: December - May.

Utility: Used in Folk medicine.

Notes: Parasitic on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Outcherloney, 02.02.1991, d 72 (Cairn Hills); KNS, Parsons valley, 08.11.1966, 2605 (FRC).

TAXILLUS Tiaghem

1. Branchlets, corolla and young leaves glabrous .... ***T. cuneatus***
1. Branchlets, corolla and young leaves densely reddish-brown tomentose **2**

2. Calyx teeth regular; corolla floccose-wooly, densely rusty-floccose below .... ***T. tomentosus***
2. Calyx teeth irregularly lobed; corolla rusty-villous, thinly grey-pubescent below ...... ***T. recurvus***

350. Taxillus cuneatus (Heyne ex Roth) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 354. 1929; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 217.1987. *Loranthus cuneatus* Heyne ex Roth, Nov. Pl. Sp. 193. 1821; Hook. f., Fl. Brit. India 5: 214. 1886; Gamble, Fl. Pres. Madras 1253 (877). 1925; Fyson, Fl. South Indian Hill St. 2: t. 232. 1932. **(PLATE 38: 327)**

Common names: Antubanjinike (K); Ottupuluri (M).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Parasitic on *Evodia*.

Parasitic shrubs; branches slender, rugulose, glabrous. Leaves to 3 x 1.5 cm, obovate, rounded or retuse at apex; nerves obscure; petiole 2-4 mm long. Racemes axillary, shortly peduncled; bracts 1 mm long, obovate. Flowers few. Calyx 1.5 mm long, irregularly toothed, pubescent. Corolla 2 cm long, tube inflated at middle, curved, greenish-white. Berry 8 mm long, ovoid, crimson.

Flowering & Fruiting: March - April.

Notes: Parasitic on shola trees ± 2200 m, common in Pykara.

PSU & NKK, Naduvattam, 06.02.1991, d 71 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 107 (TNFDH); KNS, Kodanad, 07.05.1963, 425 (FRC).

351. Taxillus recurvus (DC.) Teighen, Bull. Soc. Bot. France 42: 256. 1895; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 218.1987. *Loranthus recurvus* Wall. ex DC., Prodr. 4: 299. 1830; Hook. f., Fl. Brit. India 5: 213. 1886; Gamble, Fl. Pres. Madras 1252 (877). 1925; Fyson, Fl. South Indian Hill St. 3: t. 483. 1920. *Loranthus candolleanus* Wight & Arn., Prodr. 385. 1834. **(PLATE 38: 328)**

Distribution: Endemic to Western Ghats. *Habitat*: Parasitic on *Olea*.

Parasitic shrubs; branchlets rusty. Leaves obovate, 3-5 x 2-3 cm, base cuneate, apex obtuse, blackish green above when dry, thinly grey-pubescent below; petiole to 1.5 cm. Cymes to 6-flowered, rusty; bracts ovate, free from the calyx, but partly enveloping it below. Calyx-tube 3 mm; teeth 5, irregularly lobed. Corolla 2 cm long, yellowish green, 0.8 cm wide; tube curved, split half-way, gibbously inflated below the middle, rusty-villous; lobes 5. Stamens 5. Style 2 cm. Drupe oblong to flask-shaped, 1 x 0.4 cm, rusty.

Flowering & Fruiting: October - December.

Notes: Parasitic on shola trees ± 2050 m, common in Pykara.

352. Taxillus tomentosus (Heyne ex Roth) Tieghem, Bull. Soc. Bot. France 42: 256. 1895; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 218.1987. *Loranthus tomentosus* Heyne ex Roth, Nov. Pl. Sp. 191. 1821; Hook. f., Fl. Brit. India 5: 212. 1886; Gamble, Fl. Pres. Madras 1252 (876). 1925; Fyson, Fl. South Indian Hill St. 3: t. 482. 1920. **(PLATE 38: 329)**

Common names: Bandhanakke, Banje, Banjinike (K).

Distribution: South West India and Sri Lanka. *Habitat*: Parasitic on *Turpinia*.

Parasitic shrubs; branches lenticellate, young shoots fulvous tomentose. Leaves to 5 x 2.5 cm, obovate to oblong, obtuse, glabrous above; nerves 4-5 pairs; petiole 5 mm long. Flowers 3-8, fascicled; pedicels 2 mm long. Calyx 2 mm long, lobes triangular. Corolla greenish white, pink at base, to 16 mm long, densely hairy, tube gibbous, lobes spreading. Stigma hemispheric. Berry sub-globose, tomentose.

Flowering & Fruiting: December - June.

Notes: Parasitic on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 20.09.1994, 170 (TNFDH); KNS, Kodanad, 21.04.1964, 1234 (FRC).

59. LYTHRACEAE

ROTALA L.

353. Rotala rotundifolia (Buch.-Ham. ex Roxb.) Koehne in Engl., Bot. Jahrb. Syst. 1: 175. 1880; Gamble, Fl. Pres. Madras 509 (359). 1919; Fyson, Fl. South Indian Hill St. 3: t. 339. 1920; S.R. Srinivas. in N.C. Nair & A.N. Henry., Fl. Tamil nadu 1: 165.1983. *Ammannia rotundifolia* Buch.-Ham. ex Roxb., Fl. Ind. 446. 1820; Hook. f., Fl. Brit. India 2: 566. 1879. **(PLATE 38: 330)**

Common names: Nasukolu (K).

Distribution: South and South East Asia and also in Japan. *Habitat*: Marshy areas.

Erect herbs, to 15 cm high; stem reddish, 4-angled. Leaves to 8 x 6 mm, oblong-orbicular, sessile, glabrous, 5-nerved. Racemes 1-1.5 cm long, bracteoles 2 mm long, lanceolate. Calyx tube 2.5 mm long, lobes triangular, acute; intersepalar appendages absent. Petals 1.5 x 1 mm, obovate. Filaments attached near the base of calyx tube. Ovary 1 x 1 mm, obovoid, truncate, obtuse, 4-angled; style 1 mm long.

Flowering & Fruiting: September - March.

Notes: Found in the marshy region of sholas ± 2100 m, common in Pykara.

PSU & NKK, Kodanad, 20.07.1995, 262 (TNFDH); KNS, Longwood, 08.05.1963, 501(FRC).

60. MAGNOLIACEAE

MAGNOLIA L.

354. Magnolia nilagirica (Zenk.) Figlar, Proc. Int. Symp. Magnoliac. 23. 2000. *Michelia nilagirica* Zenk., Pl. Ind. 21. t.20. 1835; Hook. f., Fl. Brit. India 1: 44. 1872; Gamble, Fl. Pres. Madras 9 (6). 1915; K. Ramam. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 3.1983; Fyson, Fl. South Indian Hill St. 2: t. 8. 1932; D.C.S. Raju in B. D. Sharma et al., Fl. India 1: 175. 1993. **(PLATE 38: 331, 331a)**

Common names: White Champak (E); Kaadu sampige (K); Kattuchempakam, Vellachempakam (M); Kattu-shanbagam, Shembuga, Kattu chambaggam (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Trees, 20 m high, blaze yellow; branchlets tomentose, lenticellate. Leaves simple, alternate, spiral; stipules 1-1.5 cm long, oblong, coriaceous, woolly, enclosing buds,

deciduous, leaving an annular scar; petiole 15-20 mm long, slender, tomentose, grooved above; lamina 5-13 x 3-5.5 cm, obovate to elliptic-obovate, base cuneate or acute, apex acuminate or caudate acuminate, acumen twisted, margin entire, surface alveolate, glabrous above, villous beneath, coriaceous; lateral nerves 13-18 pairs, pinnate, slender, prominent, intercostae reticulate, prominent. Flowers bisexual, white, 7-10 cm across, axillary or terminal, solitary, enclosed by densely pubescent, spathaceous bracts; pedicel 8 mm long, stout. Perianth lobes 9-12, 3-5 x 1.2-1.5 cm, obovate, inner smaller. Stamens numerous, crowded at the base of gynophore; filaments short, flat; anthers up to 8 mm long, connective appendage 0.5 mm long. Carpels many, superior, ovoid, sessile, pubescent. Fruit an aggregate of capsules, 0.8 x 0.8 cm, globose; seed one, scarlet.

Flowering & Fruiting: March - August.

Propagation: The seeds are viable for two months. Fresh red colour seeds are dried under shade for a day and then immersed in water for 4 hrs. On depulping the mesocarp, the black endocarp is seen. This is sown in well-prepared mother beds. Germination is observed between 20 and 30 days, and is of about 40 percent.

Notes: Typical shola tree ± 2050 m, common in Pykara. The Red listed status of this species is Vulnerable for Karnataka, Kerala and Tamil Nadu.

PSU & NKK, Kodanad, 02.09.1995, 167 & 14.11.1994, 554 (TNFDH); KNS, Aramby shola, 25.02.1977, 6696 (FRC).

61. MALVACEAE

1. Prostrate herbs; leaves palmately 7-lobed .... ***Modiola***
1. Erect herbs or subshrubs **2**

2. Antheriferous filaments terminal to column .... ***Sida***
2. Antheriferous filaments lateral to column **3**

3. Styles as many as carpels; capsules loculicidal .... ***Abelmoschus***
3. Styles twice the number of carpels; capsule schizocarpic .... ***Urena***

ABELMOSCHUS Medic.

1. Prickly shrubs; corolla whitish-pink .... ***A. angulosus***
1. Woody subshrubs; corolla deep pink .... ***A. angulosus* var. *purpureus***

355. Abelmoschus angulosus Wall. ex Wight & Arn., Prodr. 53. 1834, var. **angulosus**; M. Chandras. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1:

31.1983; T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 301. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 52. 1996. *Hibiscus angulosus* (Wall. ex Wight & Arn.) Steud., Nomencl. Bot. (ed.2) 1: 758. 1840; Hook. f., Fl. Brit. India 1: 341. 1874; Gamble, Fl. Pres. Madras 97 (70). 1915; Fyson, Fl. South Indian Hill St. 2: t. 36. 1932. **(PLATE 39: 332)**

Common names: Kattukasthuri, Kaattusembarathi (M).

Distribution: Indo-Malesia to Australia. *Habitat*: Shola forests.

Prickly shrubs. Leaves orbicular, 3-5 lobed, hastate or cordate at base, sparsely tomentose on both sides, to 12 x 10 cm; basally 9-ribbed. Flowers in terminal racemes. Epicalyx segment ovate-acute, densely hairy along margins. Petals obovate, yellow with purple base, 8-10 cm long. Capsule densely hairy, subtended by the enlarged epicalyx.

Flowering & Fruiting: October - February.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Mukurthi, 06.02.1991, b 59 (Cairn Hills); PSU & NKK, Kodanad, 17.06.1994, 62 (TNFDH).

356. Abelmoschus angulosus Wall. ex Wight & Arn. var. **purpureus** Thw., Enum. Pl. Zeyl. 26. 1858; T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 301. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 58. 1996. *Hibiscus setinervis* Dunn, Bull. Misc. Inform. Kew 1914: 324. 1914; Gamble, Fl. Pres. Madras 97 (69). 1915. **(PLATE 39: 333)**

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Woody subshrubs to 2 m tall; stems stout, terete, densely clothed with erect, rigid, yellowish hairs. Leaves alternate, 5-14 x 6-15 cm, cordate at base, 3-7 angular or lobed, 5-7 nerved at base, margins serrate, pubescent with stiff appressed simple hairs on both surfaces; petioles to 16 cm long. Flowers axillary, solitary. Involucellar bracts 4, connate throughout their length, splitting on one side at anthesis, ovate- acute, coriaceous, erect, accrescent, prominently ribbed, densely hispid with rigid bristly hairs intermingled with short stellate hairs outside, densely appressed hairy within. Corolla to 10 cm long, uniformly deep pink. Capsules 4.5 cm long, ovoid, acute, very densely pubescent with pale yellowish, rigid shiny prickly hairs. Seeds 3 mm diameter, subglobose, brownish-black, concentrically pubescent with white hairs.

Flowering & Fruiting: October - December.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Ankinda.

MODIOLA Moench.

357. Modiola caroliniana L., G. Don, Gen. Syst. I: 465. 1831; Gamble, Fl. Pres. Madras 97(73). 1915; Fyson, Fl. South Indian Hill. St. 2: t. 33.1932; M. Chandras. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 36.1983; T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 301. 1993. *Malva caroliniana* L., Sp. Pl. 688. 1753. **(PLATE 39: 334)**

Distribution: Native of America. Naturalised in India. *Habitat*: Road sides.

Annual herbs, with tuberous root stock; stems and branches prostrate with densely stellate pubescence. Leaves digitately 3-fid, each lobe again dissected; petioles upto 3.5 cm long; stipules about 3 mm long. Flowers solitary, axillary; pedicels jointed. epicalyx segments 3, free, lanceolate. Calyx 5-lobed, lobes triangular, 3-nerved. Petals 5, red, 3-4 mm long, hardly longer than calyx. Staminal column divided at apex into numerous filaments. Fruit a schizocarps with more than 30 mericarps, hairy, mericarps 2-seeded. Seeds reniform, glabrous.

Flowering & Fruiting: March - October.

Notes: Naturalised in roadsides and waste places ± 1800 m, common in Naduvattam.

PSU & NKK, Korakundha, 18.02.1991, b 62 (Cairn Hills).

SIDA L.

358. Sida rhomboidea Roxb. ex Fleming, Asiat. Res. 11. 178. 1810; Gamble, Fl. Pres. Madras 90 (65). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 291.1920; M. Chandras. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 37.1983; Sivar. & Pradeep, Malvac. Southern Peninsular India 246. 1996. *Sida rhombifolia* var. *rhomboidea* (Roxb. ex Fleming) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *Sida rhombifolia* L. ssp. *rhombifolia* sensu Borss., Blumea 14: 193. 1966. **(PLATE 39: 335)**

Common names: Kadilanga (K); Kurumthotti (M); Athibalachedi, Chitra mutti (T).

Distribution: Peninsular India. *Habitat*: Road sides.

Erect, much branched subshrubs to 1.2 m tall; stem usually purplish. Leaves 1.5-5 x 1-3 cm, obovate, rhomboid to lanceolate, base rounded, margins coarsely serrate to crenate, entire towards base, apex subobtuse or acute. Flowers axillary, solitary. Calyx campanulate, 5-lobed; lobes triangular. Petals yellow, obliquely obovate, retuse or emarginate at apex. Staminal column to 3 mm long, stellate-pubescent, antheriferous at apex. Ovary depressed globose; styles 8-10; stigmas capitate. Schizocarp 3-4 mm long; mericarps 8-10, trigonous, apex beaked, completely included; seeds brownish-black.

Flowering & Fruiting: July - September.

Utility: Used in Ayurveda medicine. The plant is used in tuberculosis and rheumatism. Stem is also used internally in treatment of skin diseases and as a diuretic and febrifuge. Roots are used in the treatment of rheumatism and leucorrhoea. The flowers are used to cease labour pain. Leaf is used to cease menstruation problems. The flower is chewed to give temporary relief from toothache.

Notes: Found in the roadsides and waste lands ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 06.02.1991, L a 36 (Cairn Hills); PSU & NKK, Kodanad, 02.03.1994, 8 & 14.11.1994, 157 (TNFDH).

URENA L.

359. Urena lobata L., Sp. Pl. 692. 1753, ssp. **lobata**; Hook. f., Fl. Brit. India 1: 329. 1874; Gamble, Fl. Pres. Madras 92(66). 1915; M. Chandras. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 37.1983; Fyson, Fl. South Indian Hill. St. 3: t. 292.1920; Borss., Blumea 14: 140. 1966; T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 380. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 180. 1996. **(PLATE 39: 336)**

Common names: Aramina Fibre, Congo Jute, Caesarweed (E); Aramina, Doddabende, Kadu tutti, Otte (K); Cheeli, Kuruvachedi, Oorppan, Uthiram, Uram, Vattooram (M); Ottatti (T).

Distribution: Pantropical. *Habitat*: Road sides.

Erect branched subshrubs; stems densely stellate-pubescent. Leaves 3-10 x 3-9 cm, broadly to narrowly ovate, upper most leaves sometimes lanceolate, 3-5 angular to shallowly lobulate, truncate or cordate at base, margin obscurely crenate-serrate; lobes generally acute or acuminate, varying in size. Flowers axillary, usually solitary,

sometimes 2 or 3 in a cluster. Involucral bracts spathulate, connate at base, clothed with rigid hairs. Calyx 5-9 mm long, campanulate, 5-parted; lobes ovate-elliptic. Corolla pink with dark center; petals obovate with rounded apex. Staminal column 8-10 mm long, pinkish. Ovary to 4 mm across, subglobose, stiff-hirsute; stigmas capitate. Schizocarp 10-12 mm across, globose. Seeds to 4 mm long, reniform, angular.

Flowering & Fruiting: August - December.

Utility: Used in Ayurveda, Folk and Siddha medicine. Roots are diuretic and emollient. Decoction of stem and roots are used in flatulent colic. Flowers are used for cough, aphthae and sore throat.

Notes: Stem fibre is substitute for jute, and is used for cordage, ropes, coarse fabrics, carpets and linoleum, and in combination with other fibres for velveteen, artificial silks, upholstery and sail cloth. Found in all types of forest, mainly seen along the roadsides, wastelands and open places ± 1820 m, common in Naduvattam.

PSU & NKK, Naduvattam, 06.02.1991, L a37 (Cairn Hills); PSU & NKK, Kodanad, 30.09.1994, 174 (TNFDH).

62. MELASTOMATACEAE

1. Trees; ovary 1-celled, ovules few .... ***Memecylon***
1. Herbs or shrubs; ovary 4 or 5 celled, ovules many **2**

2. Flowers 3-merous .... ***Sonerila***
2. Flowers 4 or 5 merous; stamens equal .... ***Osbeckia***

MEMECYLON L.

1. Bushy shrubs; stamens dimorphic, 5 larger ones red, 5 smaller ones yellow .... ***M. randerianum***
1. Small trees; stamens 8, equal .... ***M. sisparense***

360. Memecylon randerianum SM & MR Almeida, Journ. Bombay Nat. Hist. Soc. 85: 521. 1989. *Memecylon malabaricum* (Clarke) Cogn. in A. & C. DC., Monogr. Phan. 7: 1148. 1891; Gamble, Fl. Pres. Madras 505 (356). 1919; Fyson, Fl. South Indian Hill St. 3: t. 338. 1920; K. Vivek. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 159.1983. *Memecylon amplexicaule* Roxb. var. *malabarica* Clarke in Hook. f., Fl. Brit. India 2: 559. 1879p.p. **(PLATE 39: 337)**

Common names: Daddanek kare, Hollae kudi , Hulisoppu, Lokundi (K); Kaikkathetti, Kashara, Kazhavu, Koovachekki (M); Kanjavu, Malamthetti, Perungaca, Vacci (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Shrubs, up to 3 m tall; branchlets scabrous, fimbricate with brownish scales. Leaves elliptic, 12 x 5 cm, acute at apex, truncate at base, appressed hairy on both sides with fimbricate scales on petioles and veins beneath; petioles ca 1.5 cm long. Flowers purple, in few-flowered bracteate cymes. Calyx lobes alternating with intersepalar emergences. Stamens dimorphic, 5 larger ones red, 5 smaller ones yellow. Ovary tomentose, 5-celled; ovules numerous. Capsules broadly ovoid, truncate, about 1.5 cm long; seeds numerous.

Flowering & Fruiting: February - May.

Utility: Used in Folk and Siddha medicine. Decoction of flowers and twigs is used for skin diseases. Local peoples used this species for herpis.

Notes: Found in all types of forests ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 16.03.1991, 47 & 02.08.1995, 286 (TNFDH); KNS, Longwood, 09.05.1963, 258 (FRC).

361. Memecylon sisparense Gamble, Bull. Misc. Inform. Kew 1919: 227. 1919 & Gamble, Fl. Pres. Madras 505 (356). 1919; K. Vivek. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 161.1983. **(PLATE 39: 338)**

Distribution: Southern Western Ghats. *Habitat*: Shola forests.

Large shrubs or small trees; branchlets glabrous. Leaves opposite, 3-7.5 x 3-4 cm, oblong or ovate-oblong, entire or slightly revolute at margins, rounded or slightly cordate at base, acute-obtuse at apex, lateral nerves 5-paired, inconspicuous; sessile or shortly petioled. Flowers fascicled in single or very short-peduncled cymes on lateral tubercles, or rarely axillary, bluish-red, ca 2.5 cm across; pedicels 3-4 mm long. Calyx campanulate, 2-2.5 mm long, shortly 4 or 5-toothed; teeth acute, ca 1 mm long. Petals 4, ovate, bluish-red, 1-1.5 x 1-1.5 mm. Stamens 8, equal; filaments ca 1 mm long, broad at base; anthers short. Ovary 1-celled; ovules 8; style linear, ca 2 mm long. Fruit a globose or ellipsoid berry, 1-seeded.

Flowering & Fruiting: October - January.

Notes: Rare taxon in shola forests ± 2050 m, common in Sispara.

OSBECKIA L.

1.	Flowers tetramerous; stamens 8; ovary 4-celled	***O. brachystemon***
1.	Flowers pentamerous; stamens 10; ovary-5-celled	**2**
2.	Flowers more than 6 cm wide, calyx with tufted stalked bristles; branchlets rusty	***O. reticulata***
2.	Flowers less than 4 cm wide, calyx with tufted stalked bristles; branchlets not rusty	**3**
3.	Petal margin serrate; anthers acuminately beaked; leaves 5-ribbed	***O. aspera* var. *wightiana***
3.	Petal margin entire; anthers acutely beaked; leaves 3-ribbed	**4**
4.	Peduncle absent; filaments shorter than or equal number of anthers; petal margin strigose	***O. cupularis***
4.	Peduncle to 1.5 cm; filaments longer than anthers; petal margin glabrous	***O. gracilis***

362. Osbeckia aspera (L.) Blume, Bijdr. Natuurk. Wetensch. 6: 220. 1831, var. **aspera**; Hook. f., Fl. Brit. India 2: 519. 1879 p.p; Gamble, Fl. Pres. Madras 492 (347). 1919; K. Vivek. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 161.1983. *Melastoma asperum* L., Sp. Pl. 389. 1753. *Osbeckia kleinii* Wight & Arn., Prodr. 323. 1834; Gamble, Fl. Pres. Madras 492 (348). 1919. *Osbeckia courtallensis* Gamble, Bull. Misc. Inform. Kew 1918: 242. 1918 & Gamble, Fl. Pres. Madras 492(348). 1919. *Osbeckia kewensis* C.E.C. Fisch., Bull. Misc. Inform. Kew 1938: 34. 1938. *Osbeckia lawsonii* Gamble, Bull. Misc. Inform. Kew 1918: 242. 1918 & Gamble, Fl. Pres. Madras 503 (348). 1919. **(PLATE 39: 339)**

Common names: Kattuk-kadalai (T).

Distribution: Peninsular India. *Habitat*: Grasslands.

Erect shrubs; branchlets more or less pubescent with appressed to spreading hairs. Leaves 3.5-9 x 1.5-3.2 cm, elliptic-lanceolate, base attenuate, acute to shortly acuminate at apex, basally 5-ribbed, more or less pubescent with appressed short hairs on both sides, drying yellowish-green; petiole to 1 cm long. Flowers ca 2 cm across, in terminal cymes, sometimes elongated clusters, pentamerous. Calyx tube 6-8 mm long, ca 5 mm wide, cupular, with dense short bristle-like hairs; lobes 5, oblong, obtuse. Petals 5, pink, 1-1.5 x 0.8-1 cm, ovate, apex rounded. Stamens 10; anthers 5-6 mm long. Ovary hairy at apex; style exserted, 1.25-1.5 cm long; stigma curved, papillate. Capsules 0.8-1 x 0.6-0.7 cm, ovoid, ribbed. Seeds many.

Flowering & Fruiting: August - April.

Utility: Used in Ayurveda, Folk and Siddha medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Sispara.

PSU & NKK, Naduvattam, 02.02.1991, 50 & 17.06.1994, 67 (TNFDH); KNS, Kodanad, 07.05.1963, 406 (FRC).

363. Osbeckia brachystemon Naud., Ann. Sci. Nat. Bot. ser. 3, 14: 57. 1850; K. Vivek. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 162.1983. *Osbeckia truncata* D. Don ex Wight & Arn., Prodr. 322. 1834 p.p.; Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494 (349). 1919. *Osbeckia cupularis* D. Don ex Wight & Arn., Prodr. 323. 1834 p.p.; Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494 (349). 1919. **(PLATE 39: 340)**

Distribution: Endemic to Southern Western Ghats . *Habitat*: Shola border.

Erect herbs. Leaves opposite, 1.5-3 x 1-1.8 cm, ovate or elliptic, thin coriaceous, densely strigose, 3-ribbed, base obtuse, margin entire, apex acute; petiole 4 mm, strigose. Cymes umbellate, terminal, also axillary, 2 x 2 cm. Flowers 8 mm wide; pedicel 2 mm. Calyx tube urceolate, 6 x 4 mm, equal to corolla; bristle hairs clusters, also scattered; lobes 4, lanceolate. Petals 4, white with pink blotches, obcordate, 5 x 5 mm. Stamens 8; filaments 4 mm; anthers ovoid, lobed basally, not beaked. Ovary 4 celled, subapically strigose, basally with 8 tongue shaped appendages, adnate to calyx tube; style 4 mm, curved. Capsule urceolate; seeds numerous.

Flowering & Fruiting: October - December.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Parson's valley.

PSU & NKK, Kodanad, 28.07.1995, 271 (TNFDH).

364. Osbeckia cupularis D.Don ex Wight & Arn., Prodr. Fl. Ind. 323. 1834; Fyson, Fl. South Indian Hill St. 2: t. 113. 1932. *Osbeckia leschenaultiana* DC., Prodr. 3: 142. 1828; Hook. f., Fl. Brit. India 2:520.1879; Gamble, Fl. Pres. Madras 493 (348). 1919; K. Vivek. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 162.1983. *Osbeckia gardneriana* Wight, Ic. t. 997. 1843-45. **(PLATE 40: 341)**

Common names: Nailangi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Shrubs; branchlets terete, corrugate, young parts with rufous hairs, internodes short. Leaves to 2.5 x 1.5 cm, elliptic-ovate, acute at apex, base rounded, densely pubescent, 3-5 nerved; petiole to 3 mm. Flowers terminal, solitary or capitate, pink. Calyx cup with compound rufuous hairs, stalked hairs. Petals to 2.5 cm, obovate. Stamens 10, filaments 6 mm, anthers 6 mm, twisted.

Flowering & Fruiting: November - January.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, d 49 (Cairn Hills); PSU & NKK, Kodanad, 08.08.1994, 120 & 20.10.1995, 351 (TNFDH).

365. Osbeckia gracilis Bedd., Madras J. Lit. Sci. ser. 3, 1: 45. 1864; Hook. f., Fl. Brit. India 2: 518. 1879; Gamble, Fl. Pres. Madras 494 (349). 1919; K. Vivek. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 162.1983. *Osbeckia sublaevis* Cogn. in A. & C. DC., Monogr. Phan. 7:321.1891; Gamble, Fl. Pres. Madras 492 (348). 1919. *Osbeckia lineolata* Gamble, Bull. Misc. Inform. Kew 1918: 241. 1918 & Gamble, Fl. Pres. Madras 492 (347). 1919. *Osbeckia lineolata* Gamble var. *anamalayana* Giri & M.P. Nayar, Bull. Bot. Surv. India 25: 244. 1983. **(PLATE 40: 342)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Stout shrubs; branches glaucous, glabrous. Leaves to 3.5 x 2 cm, elliptic-oblong, obtuse at apex and base, cuspidate, yellowish green, densely covered with half-adnated hairs spreading from midrib, 3-ribbed; petiole 3 mm long. Flowers in terminal cymes, pedicelled. Calyx tube 7 mm long, densely simple-hairy, lobes 4 x 3 mm, ovate-oblong, obtuse, ciliate. Petals 15 x 12 mm, obovate, ciliate, pink. Anthers 5 mm long.

Flowering & Fruiting: January - April.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Western catchment.

366. Osbeckia reticulata Bedd., Trans. Linn. Soc. London 25: 216. 1865; Hook. f., Fl. Brit. India 2: 520. 1879; Gamble, Fl. Pres. Madras 493(348). 1919; Fyson, Fl. South Indian Hill St. 3: t. 335. 1920; K. Vivek. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 162.1983. **(PLATE 40: 343)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrub; branchlets rusty. Leaves 5-8 x 2.5-4.5 cm, coriaceous, strigose, dark green above, paler below, 5-7-nerved, base obtuse, margin serrulate, apex acute; petiole 1 cm. Cymes terminal, to 6(8) cm, 4-6-flowered; peduncle 0. Flowers 5-merous, 6 cm wide. Hypanthium urceolate, 1.5 x 1.4 cm; intersepalar emergences stalked, cupular, 7 x 3 mm; lobes 5, oblong, 9 x 4 mm; bristle hairs both simple and stellate. Petals 5, purple-rose, orbicular, 4 x 3 cm. Stamens 10, to 2 cm; filaments 1 cm; anthers equal to, or slightly longer than, filaments, oblong, slightly beaked. Ovary 5-celled, 10-lobed; style 2.5 cm. Capsule urceolate, 1.8 x 1.8 cm; seeds numerous.

Flowering & Fruiting: December - August.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

PSU & NKK, Kodanad, 14.08.1994, 299 (TNFDH).

SONERILA Roxb.

1.	Stemless, slightly crispate hairy	*S. wallichii*
1.	Stems erect, elongate; leaves membranous	2
2.	Calyx tube and lobes glandular pilose; leaves 7-9 ribbed	*S. speciosa*
2.	Calyx tube glabrous; leaves 3-ribbed	*S. grandiflora*

367. Sonerila grandiflora R. Br. ex Wight & Arn., Prodr. 322. 1834; Hook. f., Fl. Brit. India 2: 535. 1879; Gamble, Fl. Pres. Madras 499 (353). 1919; K. Vivek. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 163.1983. **(PLATE 40: 344)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Herbs, to 30 cm high; stem minutely striate, reddish. Leaves to 4 x 2.2 cm, elliptic, acute at apex; attenuate at base; sharply serrate; petiole 1-2 cm long, reddish. Peduncles 3 cm long, 3-5-flowered. Flowers 2.5 cm across; pedicles 1 cm long. Sepals triangular, with a black gland at apex. Petals 13 x 10 mm, obovate, acute, pink. Anthers 6 mm long, bottle-shaped, acuminate. Capsule 10 mm long, obovoid; seeds 0.8 mm long, dark brown.

Flowering & Fruiting: November - December.

Notes: Found in moist and shady places of sholas ± 2050 m, common in Ankinda.

368. Sonerila speciosa Zenk., Ann. Sci. Nat. Bot. ser. 2, 6: 151. 1830; Hook. f., Fl. Brit. India 2: 534. 1879; Gamble, Fl. Pres. Madras 499 (352). 1919; K. Vivek. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 163.1983. **(PLATE 40: 345)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Stout herbs, to 25 cm high; stem glabrous, minutely striate, fleshy. Leaves to 8 x 3.5 cm, ovate-oblong, acute at apex and base; sharply serrulate, glabrous; petiole to 6 cm long, thick. Peduncle 6 cm long, terminal, many-flowered; pedicel 1.5 cm long. Calyx ovate, acuminate, glabrous. Capsule 7 x 5 mm, glabrous; seeds 1.2 mm long, oblong, light brown.

Flowering & Fruiting: November - December.

Notes: Found in moist and shady places of sholas ± 2050 m, common in Ankinda.

369. Sonerila wallichii Bennett, Pl. Jav. Rar. 215. 1844; Hook. f., Fl. Brit. India 2: 538. 1879,p.p.; Gamble, Fl. Pres. Madras 500 (353). 1919; K. Vivek. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 164.1983. **(PLATE 40: 346)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Erect herbs. Leaves one or very few; 5 x 3 cm, ovate, acute, cordate at base, serrulate, crispate hairy above, 3 pairs of nerves from the base; petiole 1-3 cm long. Peduncles to 9 cm long, glandular hairy; 4-6 flowered. Flowers 10 mm across; pedicels 5 mm long. Sepals triangular, hairy. Petals 5 x 4 mm, elliptic, acute, pink. Anther 2 mm long, acute. Style 5 mm long, glabrous. Capsule 2.5 x 2.5 mm, hemispheric, glandular hairy.

Flowering & Fruiting: August - November.

Notes: Found in moist and shady places of sholas ± 1800 m, common in Naduvattam.

63. MELIACEAE

1. Anthers included in the staminal tube or only the lips excerted **2**
1. Anthers excerted or filaments more or less free .... ***Trichilia***

2. Anthers 5, isomerous; seeds exarillate .... ***Aglaia***
2. Anthers 6-10, usually 6, in one row; seeds arillate .... ***Aphanamixis***

370. Aglaia bourdillonii Gamble, Bull. Misc. Inform. Kew 1915:346.1915 & Gamble, Fl. Pres. Madras 180 (129).1915; Pannell, Kew Bull. Addl. ser. 16, 120.1992; S.S. Jain & S.S.R. Bennet in Hajra et al., Fl. India 4: 462.1997. *Aglaia elaeagnoidea* (A. Juss.) Benth. var. *bourdillonii* (Gamble) K.K.N. Nair, Journ. Bombay Nat. Hist. Soc. 78: 426. 1981; N. C. Nair & R. Rajan in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 66.1983. *Aglaia roxburghiana* sensu Bedd., Fl Sylv. t. 130B. 1871, non (Wight & Arn.) Miq. 1868. **(PLATE 40: 347)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Trees, to 20 m high, bark reddish-brown, smooth; blaze dull red; branchlets covered with orange-brown scales with fimbriate margins. Leaves imparipinnate, alternate, estipulate; rachis 10-25 cm long, stout, grooved above, swollen at base, covered with lepidote scales; leaflets 7-9, opposite, 5-11 x 3-4 cm, elliptic-obovate or obovate, base acute or cuneate, apex acute or obtusely acute, margin entire, recurved, coriaceous, foveolate above and scurfy beneath; lateral nerves 9-12 pairs, parallel, prominent, intercostae obscure. Flowers ploygamo-dioecious, yellow, small, in axillary branching panicles. Calyx 5 lobed, pubescent, ciliate along margin, imbricate. Petals 5, free, ovate, imbricate. Stamens 5, included; staminal tube urceolate, margin undulate; anthers 5, obtuse. Ovary superior, 1-2-celled, stellate-tomentose, ovules 1-2 in each cell; style very short; stigma simple. Fruit a berry, 2 cm long, subglobose, obovate, densely minutely scaly; seeds 1-2.

Flowering & Fruiting: December - July.

Notes: Rare in sholas; but common in evergreen forests ± 2050 m, common in Ankinda.

APHANAMIXIS Blume

371. Aphanamixis polystachya (Wall.) Parker, Indian For. 57: 486. 1931; N. C. Nair & R. Rajan in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 66.1983; S.S. Jain & S.S.R. Bennet in Hajra et al., Fl. India 4: 477. 1997. *Aglaia polystachya* Wall. in Roxb., Fl. Ind. 2: 429. 1824. *Andersonia rohituka* Roxb., Fl. Ind. 2: 213. 1832. *Amoora rohituka* (Roxb.) Wight & Arn. in Wight, Cat 24. 1833 & Prodr. 119. 1834; Hook. f., Fl. Brit. India 1: 559. 1875; Gamble, Fl. Pres. Madras 181(130). 1915. *Amoora beddomei* Kosterm., Acta Bot. Neerl. 31: 133. 1982; Kamble & Sharma, Journ. Econ. Tax. Bot. 5: 493.1984. **(PLATE 40: 348)**

Common names: Rohituka tree, Sohaga (E); Mullumuttaga (K); Chemmaram, Karakil (M); Melampuluvam, Vellai-kongu, Vengul (T).

Distribution: India, Pakistan, Nepal, Bhutan, Bangladesh, Myanmar and Sri Lanka. *Habitat*: Shola border.

Evergreen trees; branchlets sericeous. Leaves imparipinnate, alternate, crowded at the end of branchlets, estipulate; rachis 12-44.6 cm long, stout, pubescent, swollen at base, grooved above till the lowest leaf pairs, leaflets 7-15, opposite, estipellate; petiolule 5-13 mm, odd one upto 20 mm, slender; lamina 4.5-25 x 2.5-6.5 cm, lowest pair smaller, ovate-oblong or oblanceolate, base oblique, acute, apex acute or acuminate, margin entire, undulate, coriaceous, glabrous above and glabrescent beneath; lateral nerves 7-13 pairs, pinnate, prominent; intercostae reticulate, prominent. Flowers polygamodioecious, white; panicles to 70 cm long, axillary, drooping; pedicel 2-6 mm long. Sepals 5, orbicular, thick. Petals 3, white, orbicular. Staminal tube 4 mm long, globose; anthers 6, oblong, included. Ovary superior, ovoid, pubescent, 3-celled, ovules 2 in each cell; stigma 3-lobed, subsessile. Fruit a capsule 2.5-3.5 x 3 cm, 3-lobed, glabrous yellow or purplish; seeds 2 or 3, oblong, with a scarlet aril.

Flowering & Fruiting: January - December.

Utility: Used in Ayurveda, Homeopathy, Siddha and Unani medicine. Bark is used in the treatment of enlargement of liver, spleen and abdominal complaints and tumors. Seed oil is applied in sores and as a liniment in rheumatism.

Notes: Not a typical shola tree; fairly common in evergreen forests ± 1800 m, common in Naduvattam. The red listed status of this species is Data Deficient For Tamil Nadu for Kerala and for Karnataka it is Vulnerable.

KNS, Benne RF, 13.02.1963, 124 (FRC).

TRICHILIA R. Br.

372. Trichilia connaroides (Wight & Arn.) Bentv., Acta Bot. Neerl. 11: 13. 1962; N. C. Nair & R. Rajan in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 69.1983; S.S. Jain & S.S.R. Bennet in Hajra et al., Fl. India 4: 515. 1997. *Zanthoxylum connaroides* Wight & Arn., Prodr. 148. 1834, "Zanthoxylon". *Heynea trijuga* Roxb. ex Sims, Bot. Mag. 41 t. 1738. 1815; Hook. f., Fl. Brit. India 1: 565. 1872; Gamble, Fl. Pres. Madras 183 (131). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 303.1920, non *Trichilia trijuga* Vell. 1825. **(PLATE 40: 349)**

Common names: Raikola mara, Sanna kenda, Kora (K); Karuvilangam, Korakkadi, Kozhipenali, Kedumbu, Peelimaram, Thirivembu (M); Karaibilangee, Karai, Kaaraikaruvilangam (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Trees, to 15 m high; branchlets reddish, lenticellate. Leaves imparipinnate, alternate, swollen at base, glabrous; leaflets 5-11, opposite, lamina 5-15 x 2.5-7 cm, ovate, ovate-oblong or ovate-lanceolate, base oblique, apex acuminate or shortly caudate-acuminate, margin entire, coriaceous, glabrous, glaucous beneath. Flowers bisexual, 6-8 mm across, white, in axillary corymbose panicles; pedicel articulated. Calyx lobes 5, ovate, pubescent, imbricate. Petals 5, 3-4 x 1 mm, oblong, margin ciliolate; staminal tube deeply 10-lobed, pubescent; lobes 2-fid. Stamens 10, anthers attached between the 2-fid lobes; disc annular, fleshy. Ovary superior, globose, glabrous, 2-celled, ovules 2 per cell; style slightly obconic; stigma capitate, 2-dentate. Fruit a capsule, globose, bright red, pointed, 2 valved; seed one, yellowish-brown, surrounded by a white fleshy aril.

Flowering & Fruiting: March - September.

Utility: Used in Folk medicine.

Propagation: The maximum period for the viability of seeds is for 2 months.The Fruits collected from healthy trees are depulped and separated seeds are soaked in water for a day or two. The pretreated seeds are sown in mother beds in the rooting medium containing red soil and sand in the ratio of 1:1. Burrowed beds are found more suitable. Germination occurs in 25 days. Germination percentage is of 60%.

Notes: Found in shola border and inside forests ± 1800 m, common in Naduvattam.

PSU & NKK, Gethai, 10.03.1991, a 51 (Cairn Hills); KNS, Sullikode, 22.04.1964, 1248 (FRC).

64. MENISPERMACEAE

STEPHANIA Lour.

1. Heads of flowers in stalked umbels. .... ***S. japonica***
1. Male flowers in axillary stalked heads; female flowers in condensed stalked cymes ... ***S. wightii***

373. Stephania japonica (Thunb.) Miers, Ann. Mag. Nat. Hist. ser.3, 18: 14. 1866, var. **japonica**; Gamble, Fl. Pres. Madras 29 (21). 1915; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 8.1983; Gangop. in B. D. Sharma et al., Fl.

India 1: 335. 1993. *Menispermum japonicum* Thunb., Fl. Japan 193. 1784. *Cissampelos hernandifolia* Willd., Sp. Pl. 4: 861. 1806. *Stephania hernandifolia* (Willd.) Walp., Rep. 1: 96. 1842; Hook. f., Fl. Brit. India 1: 103. 1872; Fyson, Fl. South Indian Hill St. 2: t. 9. 1932. *Cyclea hernandifolia* (Willd.) Wight & Arn., Prodr. 14. 1834. **(PLATE 41: 350)**

Common names: Lephenaballi (K); Patakilammu, Patavalli, Paasichedi (M); Molagaranai kodi (T).

Distribution: Indo-Malesia and East Asia. *Habitat*: Shola border.

Slender, herbaceous climbers. Leaves alternate, 7-10 x 4-8 cm, peltate, ovate or suborbicular, acute or obtuse at apex, puberulous beneath; petioles 2.5-4.5 cm long. Male flowers in axillary 6-8 cm long umbels, sessile or subsessile, greenish or white; sepals 8 in 2 whorls of 4 each, free, oblanceolate, ca. 1.5 mm long, glabrous or puberulous outside; petals 3-5, suborbicular, ca 0.8 mm long, greenish; stamens 6-8, connate into a peltate synandrium; anthers dehiscing transversely. Female inflorescence similar to male ones; sepals 3-5, oblong or elliptic; petals 3-5, suborbicular; staminodes absent; carpel 1, ovoid; stigmas 3-lobed. Drupes globose or obovoid, ca 6 x 8 mm, with basal stylar scar, red; endocarp transversely ridged.

Flowering & Fruiting: March - September.

Utility: Used in Ayurveda, Folk and Siddha medicine. Tubers are used for fever, diarrhoea and stomachache.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 14.11.1994, 96 (TNFDH).

374. Stephania wightii (Arn.) Dunn in Gamble, Fl. Pres. Madras 74 (21). 1915; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 8.1983; Gangop. in B. D. Sharma et al., Fl. India 1: 338. 1993. *Cyclea wightii* Arn. in Wight, Illustr. 1: 22. 1840. *Stephania rotundus* sensu Hook. f. & Thoms., Fl. Ind. 197. 1855 & in Hook. f., Fl. Brit. India 1: 103. 1872 p. p. non Lour., 1790. **(PLATE 41: 351)**

Common names: Mahalikizhangu, Malathangi (M).

Distribution: Indo-Malesia. *Habitat*: *Habitat*: Shola border.

Creeping herbs. Leaves 8 cm across, orbicular, glaucous, margins wavy or coarsely dentate; petiole 8 cm long, slender. Peduncle to 2 cm long, erect; pedicel 3 mm long. Male flowers densely packed in heads. Female flowers 3 mm across, in pedunculate cymes. Sepals 5, ovate acute glabrous. Petals ovate, greenish yellow. Drupe 8 x 5 mm, oblique, stalked, with 4 rows of tubercles along the margins.

Flowering & Fruiting: April - June.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 1600 m, common in Lambs rock.

65. MIMOSOIDEAE (LEGUMINOSAE)

1. Large trees, phyllodes present .... *Racosperma*
1. Small trees; leaves 2- pinnate .... *Acacia*

ACACIA P. Mill.

1. Flowers cream .... *A. mearnsii*
1. Flowers bright yellow .... *A. dealbata*

375. Acacia dealbata Link, Enum. Hort. Berol. 445. 1822; Gamble, Fl. Pres. Madras 429 (304). 1919; Fyson, Fl. South Indian Hill St. 2: t. 94. 1932; E. Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 134. 1983; Sanjappa, Legumes Ind. 47. 1992. **(PLATE 41: 352)**

Common names: Silver Wattle (E); Wattle (M); Seekai maram (T).

Distribution: Native of Australia. *Habitat*: Planted.

Evergreen unarmed trees, to 20 m high; bark grey, fairly smooth; branchlets and leaves grey-hoary. Leaves bipinnate, alternate, stipulate; rachis 3-9 cm, slender, pulvinate, silvery pubescent; pinnae 18-21 pairs, 0.7-2.8 cm long, slender, with a gland between each pairs on the upper side, even pinnate; leaflets 20-80, opposite, sessile, minute; lamina 2-4 x. 5-1 mm, oblong, linear or linear-oblong, base obliquely truncate, apex obtuse, margin entire, silvery pubescent, glaucous, chartaceous; lateral nerves obscure. Flowers yellow, very sweet scented, heads in axillary or terminal panicles; peduncle 5-10 mm long, ochraceous tomentellous. Calyx 1-1.5 x 0.5-1.5 mm, 5-fid. Corolla 2.3-3.5 mm long; petals oblong. Stamens many, 3.5-4.5 mm long. Ovary 4-5 mm long, subsessile, oblong, style 3-4 mm long; stigma minute, terminal.

Fruit a pod 2.5-8 x 0.5-1 cm, flat, straight or curved, irregularly constricted between the seeds, acuminate at the apex, glabrous, dark reddish-brown; stalk very short; seeds 2-6, 5-6 x 3.5-4 mm, horizontal.

Flowering & Fruiting: September – March.

Propagation: Seed sowing can be done in October. The seeds are long lived (1-2 years). Germination percentage is 68% and its period is of about 90 days. Pre-sowing treatment like acid treatment and scarification is preferred.

Notes: Mainly planted in grasslands ± 2050 m, common in Pykara.

PSU & NKK, Anumapuram, 29.01.1991, d 11 (Cairn Hills); PSU & NKK, Kodanad, 04.11.1994, 213 (TNFDH); MRN, Aramby shola, 15.05.1953, 22614 (FRC).

376. Acacia mearnsii Wilde, Pl. Bequaert. 3: 61. 1925, "mearnsi"; E. Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 135. 1983; Sanjappa, Legumes Ind. 50. 1992. *Acacia decurrens* (Wendl.) Willd. var. *mollis* Lindl., Bot. Reg. 5. t. 371. 1819. **(PLATE 41: 353)**

Common names: Black Wattle (E); Chauvukku, Wattle (T).

Distribution: Native of Australia, widely planted in Asia. *Habitat*: Planted.

Trees, to 15 m high; young parts silky; branchlets semiterete. Leaves bipinnate, alternate, stipulate; rachis 4-12 cm long, slender, pulvinate, pubescent, a gland at the base of the rachis on the upper side; pinnae 8-21 pairs, subopposite, 1.5-6 cm long, slender, a gland between each pairs on the upper side; leaflets 36-90, subsessile, subopposite; lamina 1.5-4 x 0.5-1 mm, linear or linear-oblong, base obtuse, subacute or obliquely truncate, apex obtuse or subacute, margin entire, puberulent, membranous, veins obscure. Flowers bisexual, white or creamy, sessile, heads arranged in axillary or terminal panicles or racemes. Calyx 2.5-3 x 2-2.8 mm, ochraceous puberulous; lobes 5, ca. 2 x 1 mm, oblong. Corolla 3.5-4 mm long; lobes 5, 2.5-3.5 x 1-2 mm, triangular-oblong. Stamens 4-5 mm long. Ovary superior, 4.5-5 mm long; style 4-5 mm long. Fruit a pod, 3-10 x 0.5-1 cm, flat, narrow, straight to slightly curved, usually constricted between the seeds, tomentose, blackish-brown.

Flowering & Fruiting: March - October.

Notes: Mainly planted in grasslands ± 2050 m, common in Pykara.

KNS, Nilgiris, 12.05.1963, 612 (FRC).

377. Racosperma melanoxylon (R. Br.) Pedley, Bot. J. Linn. Soc. 92: 240. 1986. *Acacia melanoxylon* R.Br. in Ait.f., Hort. Kew. (ed. 2) 5: 462. 1813; Hook. f., Fl. Brit. India 2: 292. 1878; Gamble, Fl. Pres. Madras 429 (304). 1919; Fyson, Fl. South Indian Hill St. 2: t. 93. 1932; E. Vajr. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 135. 1983; Sanjappa, Legumes Ind. 50. 1992. **(PLATE 41: 354)**

Common names: Australian Blackwood, Black wattle, Blackwood Acacia (E); Karutha wattle (M); Mattu seeka, Therchavukku (T).

Distribution: Native of Australia, widely planted in Asia. *Habitat*: Shola border.

Trees, 10-35 m high; bark dark greyish; branchlets angled to terete, 3-6 mm thick. Phyllodes alternate; falcate-elliptic to lanceolate, 4-14 x 0.5-1.5 cm, attenuate at base, acute-attenuate at apex, coriaceous, glabrous, brown when dry; gland near base, obscure; main veins 3-5 (-6), more or less parallel, faint. Inflorescence axillary racemes of head; peduncles 3-5 mm long. Flowers white; calyx ca 2.5 x 2 mm; lobes oblanceolate, ca 2 x 0.8 mm, membranous; corolla ca 3.5 x 3 mm; lobes obovate, ca 3 x 1.5 mm; stamens 4-5 mm long; ovary ca 2.5 mm long; style lateral, ca 2 mm long. Pods twisted or curved in a ring, 3.5-15 x 0.5-1.2 cm, flat, unlobed or constricted once or twice, thin, glabrous, green, brown or dark reddish-brown or blackish when dry, bullate along seeds; seeds 2-4 oblong, 6-8 x 3.5-4 mm, black, enclosed by reddish 2-folded funcile.

Flowering & Fruiting: January - December.

Notes: Naturalised in shola forests ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, 14 (TNFDH); KNS, Naduvattam, 24.05.1972, 4381 (FRC).

66. MORACEAE

1.	Small herbs; inflorescence coenanthium	*Dorstenia*
1.	Woody climbers; inflorescence hypanthodium	*Ficus*

DORSTENIA L.

378. Dorstenia indica Wall. ex Wight, Ic.t.1964. 1853; Hook. f., Fl. Brit. India 5: 494. 1988; Gamble, Fl. Pres. Madras 1370 (958). 1928; Fyson, Fl. South Indian Hill St. 3: t. 505. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 250.1987. **(PLATE 41: 355)**

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Herbs. Leaves alternate, to 9 x 2.5 cm, obovate or oblanceolate, acute, base attenuate or cuneate, membranous, distantly toothed, sparsely hirsute along the nerves beneath, nerves 8-13 pairs; petiole 1 cm long. Flowers monoecious, many, on obconical receptacle. Receptacle axillary, solitary, discoid, 5-angled, to 1.5 cm across, marginal lobes to 0.5 cm long; peduncles to 2 cm long. Male flowers towards the periphery of the receptacle; perianth connate and adnate with receptacle; stamens 3. Female flowers grouped at the centre; ovary sunken in the tissue of the receptacle; style lateral, stigmas 2. Fruit an achene, sunken.

Flowering & Fruiting: February - April.

Notes: Found in moist, shady and rocky slopes of sholas ± 1800 m, common in Naduvattam.

FICUS L.

379. Ficus laevis Blume var. **macrocarpa** (Miq.) Corner, Gard. Bull. Singapore 18: 7. 1960. *Pogonotrophe macrocarpa* Miq. in Hook.'s London J. Bot. 7: 74. 1848. *Ficus amplocarpa* Govind. & Masila., Proc. Indian Acad. Sci. (Pl. Sci.) 91: 117. 1982; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 251.1987. *Ficus macrocarpa* (Miq.) Wight ex King, Ann. Roy. Bot. Gard. (Calcutta) 1: 166. t.208. 1888; Hook. f., Fl. Brit. India 5: 534. 1888, non Blume 1825; Gamble, Fl. Pres. Madras 1365 (955). 1928. **(PLATE 41: 356)**

Common names: Peyathi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Woody straggler; twigs glabrous; branchlets puberulous when young. Leaves alternate, elliptic-ovate, 15 x 10 cm, membranous, pubescent or glabrescent beneath, caudate at apex, rounded or subcordate at base; lateral nerves 4-5 pairs; petioles about 4 cm long. Receptacle cauliflorus, white spotted, ca. 7 cm across, globose; peduncles to 1 cm.

Flowering & Fruiting: August - April.

Notes: Climbing on shola trees, ± 1700 m, common in Thaishola.

67. MYRSINACEAE

1. Plants trees 2
1. Plants shrubs or climbing shrubs 3

2. Calyx-lobes with many resinous lines and dots .... *Rapanea*
2. Calyx-lobes with few resinous lines or dots .... *Myrsine*

3. Ovary inferior; fruit many seeded .... *Maesa*
3. Ovary superior; fruit 1-seeded 4

4. Corolla-lobes contorted; erect shrubs .... *Ardisia*
4. Corolla-lobes imbricate; straggling shrubs .... *Embelia*

ARDISIA Sw.

1. Calyx lobes moderate-sized; inflorescence terminal or subterminal panicles .... *A. sonchifolia*
1. Calyx lobes small; inflorescence axillary or lateral 2

2. Leaves rhomboid, attenuate at base, margin usually recurved .... *A. rhomboidea*
2. Leaves lanceolate, rounded at base, margin not recurved .... *A. pauciflora*

380. Ardisia pauciflora Heyne ex Roxb., Fl. Ind. 2: 279. 1824; Hook. f., Fl. Brit. India 3: 529. 1882; Gamble, Fl. Pres. Madras 755 (531). 1928; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 60.1987. **(PLATE 41: 357)**

Common names: Muttamaram (M).

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Shrubs, branchlets radiate, densely punctuate with red glands. Leaves elliptic, acuminate at both ends, densely punctuate with black glands below; nerves indistinct; petiole 5 mm long. Racemes umbellate, axillary; peduncles to 1.5 cm long. Flowers few-together; pedicels short. Sepals ovate, acute, hairy, punctate. Corolla lobes 2.5 mm long, ovate, acute, reddish brown, glabrous. Anthers apiculate. Berry 6 mm across, globose, black, smooth.

Flowering & Fruiting: February - May.

Notes: Found in undergrowth of shola trees ± 2100 m, common in Ankinda.

381. Ardisia rhomboidea Wight, Ic. t. 1213. 1848; Hook. f., Fl. Brit. India 3: 529. 1882; Gamble, Fl. Pres. Madras 755 (531). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 61.1987. **(PLATE 41: 358)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 7 m high. Leaves simple, alternate, estipulate; petiole 4-7 mm long, slender, glabrous when mature; lamina 2-10 x 2-3.5 cm, rhomboid, base attenuate or cuneate, apex acuminate, acute or obtuse, margin entire or very obscurely crenulate, recurved, glabrous, with scattered brown glands on both sides, chartaceous; nerves obscure. Flowers bisexual, 3-3.5 mm across, pinkish-white, in axillary compound umbellate cymes; peduncle 1-1.5 cm long; pedicel 6-8 m long, slender, red puberulus; bracts lanceolate. Calyx lobes 5, 0.5-1 mm long, triangular-ovate, ciliate, punctate with red glands on one side. Corolla lobes 5, 2.5-3 mm long, pink, rotate, ovate-lanceolate, punctate. Stamens 5; filaments short; anthers apiculate, sagitate. Ovary 1 mm across, superior, 1-celled, ovules few to many, globose; style simple; stigma terminal. Fruit a berry, 5-6 mm across, with persistent stylar base.

Flowering & Fruiting: September - December.

Notes: Found in second storey of sholas ± 2050 m, common in Sispara.

382. Ardisia sonchifolia Mez in Engl., Pflanzenreich Myrsinac. 116. 1902; Gamble, Fl. Pres. Madras 755 (531). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 61.1987. *Ardisia villosa* Roxb. var. *obtusa* Clarke in Hook. f., Fl. Brit. India 3: 525. 1882. **(PLATE 42: 359)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Shrubs; branchlets gland-dotted. Leaves 10-22 x 4-6 cm, oblanceolate, acute to acuminate at apex, attenuate and auricled at base, entire; nerves ca. 16 pairs, strongly punctuate along the margins; petiole 5 mm long. Umbels terminal, 5 x 5 cm, tomentose, peduncled; pedicels 5-6 mm long, rusty-tomentose. Flowers 5-15 in an umbel, pale pink; sepals 3 x 1.5 mm, ovate, acute, hairy; corolla lobes 4 mm long, ovate, acute, punctate; anthers acute. Berry 6-7 mm across, pink, glabrous.

Flowering & Fruiting: March - April.

Notes: Found in open areas of sholas ± 1800 m, common in Naduvattam.

EMBELIA Burm.f.

1. Inflorescence terminal and axillary **2**
1. Inflorescence axillary .... ***E. gardneriana***

2. Petals small, villous on both-sides; leaves chartaceous, petiole slender .... *E. ribes*
2. Petals rather larger, glabrous, papillose within; leaves coriaceous, petiole stout .... *E. adnata*

383. Embelia adnata Bedd. ex Clarke in Hook. f., Fl. Brit. India 3: 514. 1882; Gamble, Fl. Pres. Madras 752 (529). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 61.1987. **(PLATE 42: 360)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Large climbers, branchlets stout, lenticellate, reddish. Leaves to 8 x 4 cm, oblong, subacute at apex, rounded or cordate at base, thickly coriaceous, shining above; lateral nerves indistinct; petiole 5 mm long, stout. Panicles terminal, branches long, puberulus. Flowers many, shortly pedicellate; sepals 1 mm long, ovate, pubescent outside; corolla lobes 5, 2 mm long, ovate, densely villous within; anthers with a brown gland at back; ovary globose, glabrous; style conical.

Flowering & Fruiting: August - December.

Notes: Found in open areas along roadsides ± 1900 m, common in Penstock, Emerald.

384. Embelia gardneriana Wight, Ic. t. 1208. 1848; Hook. f., Fl. Brit. India 3: 517. 1882; Gamble, Fl. Pres. Madras 752 (529). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 61.1987. **(PLATE 42: 361)**

Common names: Huliguruke (K).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Ecotones of shola-grasslands.

Climbers; branches clothed with rufous hairs. Leaves alternate, up to 7.5 x 3.5 cm, ovate, coriaceous, crenate, prominently reticulate, rusty-pilose on the nerves beneath or on the branchlets. Inflorescence axillary subumbellate racemes on very short peduncles. Flowers small, white; bracts usually small; bracteoles 0. Calyx free, persistent, 4 or 5 lobed. Corolla-tube none or short; petals 5, oblong, gland-dotted. Stamens 4 or 5; filaments inserted on the corolla, short or elongate; anthers ovate-oblong. Ovary ovoid or globose; ovules few on a subglobose placenta; style short; stigma capitate. Fruit a small globose usually 1-seeded berry; seed globose, hollowed at the base.

Flowering & Fruiting: June - October.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Ankinda.

385. Embelia ribes Burm. f., Fl. Ind. 62. t.23.1768; Hook. f., Fl. Brit. India 3:513.1882; Gamble, Fl. Pres. Madras 752 (529). 1921; Fyson, Fl. South Indian Hill St. 3: t. 410. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 61.1987. *Embelia glandulifera* Wight, Ic. t. 1207. 1848. **(PLATE 42: 362)**

Common names: Embelia, Vidanga, Baoberang (E); Vaayu vilanga, Vayu vidang, Hulimeese (K); Vayuvilangam, Vizhalari, Vizhal (M); Kattukodi, Vayuvilanga, Vayividanga, Vollai (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Climbers; branchlets slender, white, without lenticellate. Leaves to 7 x 3 cm, elliptic, acute at both ends; nerves many, parallel, faint; petiole 1 cm long. Panicles 15 x 15 cm, glabrous, branches long, slender racemose; pedicels 1.5 cm long. Flowers white, many; sepals small, triangular, tomentose; petals 2 mm long, ovate, acute, densely tomentose. Berry 2.5 mm across, globose.

Flowering & Fruiting: March- August.

Utility: Used in Ayurveda, Folk, Homeopathy, Tibetain and Unani medicine. A powerful anthelmintic and light acrid, astringemnt, alternative, nervine tonic. Used for constipation, colic, indigestion, flatulence, piles, leprosy, and skin diseases. The paste is locally applied against ringworm and other cutaneous affections. The seed powder is used in headache. Root improves digestion and cures flatulence and colic. Powder made from dried bark of the root is a reputed remedy for toothache.

Notes: The Red listed status of this species is Vulnerable for Karnataka and Tamil Nadu and Near threatened in Kerala. It is evergreen species not common in sholas ± 1600 m, rare in Coonoor.

KNS, Coonoor, 19.03.1969, 3678 (FRC).

MAESA Forssk.

386. **Maesa indica** (Roxb.) DC., Trans. Linn. Soc. London 17: 134. 1834; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 62.1987. *Baeobotrys indica* Roxb., Fl. Ind. 2: 230. 1824. *Maesa dubia* (Wall.) DC., Trans. Linn. Soc. London 17: 134. 1834; Hook. f., Fl. Brit. India 3: 510. 1882; Gamble, Fl. Pres. Madras 749 (527). 1921. *Maesa perrottetiana* A. DC. in DC., Prodr. 8: 80. 1844; Gamble, Fl. Pres. Madras 749 (527). 1921; Fyson, Fl. South Indian Hill St. 3: t. 409. 1920. *Maesa*

indica (Roxb.) DC. var. *perrottetiana* (A. DC.) Clarke in Hook. f., Fl. Brit. India 3: 509. 1882. **(PLATE 42: 363)**

Common names: Wild-tea (E); Guddehargi, Kadu vayvidang, Mandese, Manimundan (K); Kireethi, Kattuvizhal, Vannathi, Vannanmaram, Vannara (M); Mani-mundan (T).

Distribution: Indo-Malesia and Pakistan. *Habitat*: Shola forests.

Large shrubs; branchlets glandular. Leaves alternate, 10-15 x 4-8 cm, ovate, acute at apex, rounded and cuneate at base, serrate, glandular, membranous, with many glandular lines; nerves 10 pairs, regular; petiole 1.5-3 cm long. Flowers in axillary branched 3-6 cm long racemes; pedicels 2 mm long; bracteoles 2, opposite, inserted, below the calyx; calyx tube adnate to the ovary, lobes 5, orbicular, 0.5 mm long; corolla white, 4 mm across, lobes obovate; stamens 5; anthers orbicular; ovary 1-celled, ovules many, immersed in globose placenta, stigma capitate. Fruit a fleshy berry, 4 mm across; seeds few, angular, black.

Flowering & Fruiting: September - May.

Utility: Used in Folk medicine. The fruits are edible and are considered anthelmintic. Roots are used in syphilis. Leaves are used as curries in North Kanara of Karnataka; leaves and fruits are used as fish poision.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 11.03.1994, 268 & 22.06.1994, 75 (TNFDH); KNS, Naduvattam, 26.04.1964, 1334 (FRC).

MYRSINE L.

387. Myrsine wightiana Wall. ex DC., Trans. Linn. Soc. London 17: 106. 1834; Fyson, Fl. South Indian Hill St. 2: t. 182. 1932. *Myrsine capitellata* Wall. var. *lanceolata* Clarke in Hook. f., Fl. Brit. India 3: 512. 1882. *Myrsine capitellata* sensu Wight, Ic. t. 1211. 1848, non Wall. 1824. *Rapanea wightiana* (Wall. ex DC.) Mez in Engl., Pflanzenreich Myrsin. 360. 1902; Gamble, Fl. Pres. Madras 751(528). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 62.1987. **(PLATE 42: 364)**

Common names: Cheeramaram (M); Kakka pazham (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Trees, to 10 m high, branchlets slender, with prominent petiolar scars. Leaves simple, alternate, clustered towards the tip of branchlets; petiole to 10 mm long; lamina 7.5-8 x 1.5-3.5 cm, oblanceolate, base attenuate, apex acute, margin entire, recurved, glabrous, coriaceous, punctate; lateral nerves 6-8 pairs, obscure. Flowers polygamous, 4 mm across, in 5-8 flowered fascicles; pedicel to 1 mm long; bracts ovate. Calyx tube 1 mm long; lobes 5, 0.1-0.15 cm long, cuneate, punctate, acute, ciliate. Corolla lobes 5, 2-3 mm long, glandular hairy along the margin. Stamens 5, sessile, basifixed. Ovary superior, ovoid, 1-celled; style short; stigma slightly 2-lobed. Fruit a berry, 3 mm wide, subglobose, purple; seed single, globose.

Flowering & Fruiting: January - June.

Notes: A typical shola tree ± 2100 m, common in Dodabetta.

PSU & NKK, Kodanad, 20.09.1994, 350 (TNFDH); KNS, Longwood, 08.05.1963, 462 (FRC).

RAPANEA Aublet

1. Flowers sessile; leaves subsessile .... ***R. capitellata***
1. Flowers shortly pedicelled; leaves with slender petiole .... ***R. daphnoides***

388. Rapanea capitellata (Wall.) Mez in Engl., Pflanzenreich Myrsin. 356. 1902, var. **capitellata**; Gamble, Fl. Pres. Madras 750 (528). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 62.1987. *Myrsine capitellata* Wall. in Roxb., Fl. Ind. 2: 295. 1824; Hook. f., Fl. Brit. India 3: 512. 1882 p.p. **(PLATE 42: 365)**

Distribution: India, Nepal and Bhutan. *Habitat*: Shola forests.

Trees, to 15 m high; branchlets stout, glabrous, covered with numerous closely placed leaf scars. Leaves simple, alternate below, opposite above, estipulate; petiole 5-7 mm long, stout, glabrous; lamina 5-12 x 1-4.5 cm, elliptic, oblanceolate or obovate, base cuneate or attenuate, apex acute or obtusely acute, margin entire, glabrous, coriaceous; lateral nerves 6-8 pairs, pinnate, faint, intercostae obscure. Flowers bisexual, white, sessile, very shortly stalked in umbellate fascicles, axillary or around branchlets; peduncle 1.5 mm; bracts minute; calyx lobes 5, 1.5 mm, ciliate, acute; corolla 5 mm across; lobes 5, oblanceolate, 3.5 mm, valvate, gland-dotted; stamens 5, exserted, subsessile; ovary superior, 1 mm, conical, ovules few; style 0.3 mm; stigmas 3, flat, spreading. Fruit a drupe, 4 mm across, globose, brownish-black; seed one, globose.

Flowering & Fruiting: March - May.

Propagation: The seeds are viable for three months. Ripened fruits are collected from healthy mother trees. The fruits are crushed and depulped. The seeds are separated from depulped fruits, dried and sown in well prepared mother beds containing appropriate rooting medium. Germination is about 20 percent.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Parsons valley.

389. Rapanea daphnoides Mez in Engl., Pflanzenreich Myrsin. 357. 1902; Gamble, Fl. Pres. Madras 751(528). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 62.1987. **(PLATE 42: 366)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Shrubs, branchlets slender, rough with persistent leaf-scars. Leaves to 7 x 1.5 cm, linear-lanceolate, obtuse at apex, glabrous, subcoriaceous; petiole 5-10 mm long. Flowers densely fascicled; sepals 1 mm long, ovate, glandulose; corolla 3 mm long, densely papillose, glandular lineolate. Berry 5 mm across, globose, densely covered with glands.

Flowering & Fruiting: February - May.

Notes: Found in the ecotone region of sholas and grasslands ± 1700 m, common in Thaishola.

68. MYRTACEAE

1. Leaves alternate .... *Eucalyptus*
1. Leaves opposite **2**

2. Shrubs; leaves tomentose, rugose; corolla rose coloured .... *Rhodomyrtus*
2. Trees; leaves glabrous; corolla mostly creamy .... *Syzygium*

EUCALYPTUS L' Herit

1. Buds single in axis, warty, glaucous .... *E. globulus*
1. Buds more than one per inflorescence .... *E. grandis*

390. Eucalyptus globulus Labill., Rel. Voy. Rech. Perouse 1: 153. 1799; Gamble, Fl. Pres. Madras 486 (343). 1919; Fyson, Fl. South Indian Hill St. 3: t. 333. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 151.1987. **(PLATE 42: 367)**

Common names: Blue gum, Eucalyptus, Tasmanian blue gum (E); Eucali, Yukkalimaram (M); Karuramaram, Karpuramaram, Nilgiri-thailamaram, Thayila maram, Yukkali (T).

Distribution: Native of Tasmania; widely cultivated in Sri Lanka and India. *Habitat*: Planted.

Trees, to 30 m high; bark smooth, peeling off in long stripes. Leaves of the seedlings opposite, sessile, amplexicaul, 6-12 x 2.5-7 cm, bluish-green, glaucous, strongly discolourous, juvenile leaves opposite, sessile, 7-15 x 4-9 cm, elliptic-ovate, glaucous, strongly discolourous, amplexicaule; intermediate leaves alternate, petiolate, glabrous, broadly lanceolate; adult leaves alternate; petiole to 30 mm, stout, glabrous; lamina 10-30 x 3-4 cm, falcate or lanceolate, base acute or obtuse, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves many, pinnate, prominent, intercostae reticulate, pellucid-punctate. Flowers bisexual, to 4 cm across, axillary, solitary; buds sessile, 3 x 2 cm, turbinate, warty, glaucous; hypanthium ribbed, to 1 cm; operculum long, flat, with a central knob; stamens many, free, 0.5-1.5 cm; anthers obovoid, 0.5-1 mm, versatile; ovary inferior, adnate to the hypanthium, 3-5-celled, ovules many; style simple; stigma capitate. Fruit a capsule, sessile, globose or hemispherical, 4-ribbed, warty, disc broad, convex; valves 3-5; seeds many.

Flowering & Fruiting: September - December.

Utility: Used in Ayurveda, Folk, Homeopathy and Modern medicine.

Notes: Mainly planted in grasslands ± 2000 m, common in Pykara.

NDB, Ooty, 03.05.1962, 722 (FRC).

391. Eucalyptus grandis Hill ex Maid. Forest Fl. n.s. Wales 1: 79. 1903 & Crit. Rev. Eucalypt. 4: 338. 1920. **(PLATE 43: 368)**

Common names: Flooded Gum, Rose Gum (E); Grandis (M); Grandis (T).

Distribution: Native of Australia. *Habitat*: Planted.

Trees to 50 m high; bark white, smooth. Leaves simple, alternate, estipulate seedling leaf opposite for 4 or 5 pairs; petiole to 30 mm long, slender, glabrous; juvenile leaves 10-14 x 5.5-8.5 cm; adult leaves 10-16 x 2-3 cm, ovate, falcate or lanceolate, base oblique, obtuse, attenuate or subacute, apex acuminate, margin entire, glabrous, coriaceous, gland-dotted; lateral nerves many, pinnate, faint, looped near the margin

forming intramarginal nerve, intercostae reticulate. Flowers bisexual, white, in 7-11 flowered axillary umbels; pedicels to 3.5 mm; hypanthium obconical, to 5 mm, glaucous, ribbed; operculum hemispherical or beaked, to 4 mm; stamens many, 2-7 mm, with a distal adaxial gland; ovary inferior, adnate to the hypanthium, 3-4-celled, ovules many; style simple, stigma capitate. Fruit a capsule, 5-8 x 4-6 mm, sessile or pedicellate, pyriform, 4 or 5 valved, often glaucous, disc narrow; seeds many.

Flowering & Fruiting: September - April.

Notes: Mainly planted in grasslands ± 1800 m, common in Naduvattam.

KNS, Masinagudi Range Office, 27.04.1964, 1347 (FRC).

RHODOMYRTUS (DC.) Reichb.

392. Rhodomyrtus tomentosa (Sol. ex Ait.) Hassk., Flora 25: 35. 1842; Hook. f., Fl. Brit. India 2: 469. 1878; Gamble, Fl. Pres. Madras 471(533). 1919; Fyson, Fl. South Indian Hill St. 2: t. 108. 1932; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 154.1987. *Myrtus tomentosa* Sol. ex Ait., Hort. Kew (ed. 1) 2: 159. 1789. **(PLATE 43: 369)**

Common names: Downy rose myrtle, Hill Gooseberry (E); Thavatte (K); Cherukotlampazham, Koratta, Kirattan, Thavattukoyya, Thaontay (M); Thavattukoyya, Thavittu-palam (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola border.

Stout shrubs, densely tomentose; branchlets terete. Leaves to 5 x 2.5 cm, elliptic-obovate, 3-ribbed, densely white-tomentose below; petiole 5 mm long. Cymes 15 cm broad, terminal or upper axillary. Flowers pedicelled, calyx tube globose, 6 mm long, pink, densely tomentose, lobes 5, orbicular; petals 5, white, orbicular, hairy outside; stamens many, filaments 8 mm long, pink; ovary 2-3-celled; style stellate, ovules few, hairy. Capsule 10 mm across; globose, densely hairy.

Flowering & Fruiting: February - May.

Utility: Used in Folk medicine.

Propagation: The seeds are viable for 15 days. The fleshy and well ripened fruits are collected from well matured plant. Fleshy fruits are crushed and depulped. Small sized seeds are collected and dried for a day in sunlight. Dried seeds are sown in

mother bed with rooting medium of red soil and sand at the ratio of 1:1. Seeds germinate in 45- 60 days. Germination is about 20 %.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Parsons Valley.

PSU & NKK, Kodanad, 10.05.1994, 48 (TNFDH); KNS, Dodabetta, 08.02.1963, 36 (FRC).

SYZYGIUM R. Br. ex Gaertn.

1. Calyx-tube with a thickened staminal disc at the mouth; flowers usually large .... ***S. hemisphericum***
1. Calyx-tube without a thickened staminal disc at the mouth; flowers usually small **2**

2. Petals usually free, though deciduous **3**
2. Petals usually falling in one piece, calyptrate **4**

3. Calyx-tube short, turbinate; leaves coriaceous, the nerves close together .... ***S. densiflorum***
3. Calyx-tube elongate, funnel shaped; leaves chartaceous, the nerves not close together .... ***S. lanceolatum***

4. Branchlets tetragonus; calyx-tube turbinate .... ***S. grande***
4. Branchlets terete **5**

5. Leaves sub-orbicular, small, crowded, nerves close; flowers in terminal compact corymbs .... ***S. calophyllifolium***
5. Leaves elliptic-lanceolate, rather large; cymes lateral, usually from the scars of fallen leaves .... ***S. cumini***

393. Syzygium calophyllifolium Walp., Rep. 2: 180. 1843; Gamble, Fl. Pres. Madras 480 (339). 1919; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 155.1987. *Eugenia calophyllifolia* (Walp.) Wight, Ic. t. 1000. 1845; Hook. f., Fl. Brit. India 2: 494. 1878; Fyson, Fl. South Indian Hill St. 2: t. 112. 1932. **(PLATE 43: 370)**

Common names: Kurunainaval (T).

Distribution: Western Ghats and Sri Lanka. *Habitat*: Shola forests.

Evergreen trees, to 20 m high; bark thick, brown, rough; blaze pink; branchlets terete. Leaves simple, opposite, estipulate; petiole 2-3 mm, stout, glabrous; lamina 2-5 x 1.5-3 cm, obovate or suborbicular, base obtuse, or round, obtusely acute or slightly emarginate, margin entire, glabrous, pellucid dotted, coriaceous; lateral nerves many, parallel, slender, very close, prominent, looped at the margin forming intramarginal nerve, intercostae reticulate, slender but prominent. Flowers bisexual, white, in dense

terminal corymbs; peduncle 4 angled, articulated at ramifications; calyx tube 3 mm long, ovoid; lobes 4, minute; petals 4, calyptrate; stamens many, bent inwards at the middle in bud; ovary inferior, 2-celled; ovules many; style 5-6 mm long. Fruit a berry, 10-12 mm long, oblong or obovoid, dark purple.

Flowering & Fruiting: February - May.

Utility: Used in Folk medicine.

Propagation: Seeds are viable for one month and best to sow for within one week. Fresh fruits are brought to nursery and depulped manually, dried for a couple of days and sown in mother beds. Seedlings are maintained for about 30 to 40 days to attain 2 to 3 pairs of leaf stage for ideal pricking and transplantation to polybags. Seeds germination showed 60 percent.

Notes: A typical shola tree ± 2050 m, common in Dodabetta.

PSU & NKK, Dodabetta, 13..02.1991, I d 42 (Cairn Hills); KNS, Dodabetta, 10.05.1963, 551 (FRC).

394. Syzygium cumini (L.) Skeels, U. S. DA. Bur. Pl. Industr. Bull. 248: 2. 1912, var. **cumini;** V. Chithra in Henry et al., Fl. Tamil Nadu 2: 156.1987. *Myrtus cumini* L., Sp. Pl. 471. 1753. *Eugenia jambolana* Lam., Encycl. 3: 198. 1789; Hook. f., Fl. Brit. India 2: 499. 1879. *Syzygium jambolanum* (Lam.) DC., Prodr. 3: 259. 1828; Gamble, Fl. Pres. Madras 481(340). 1919; Fyson, Fl. South Indian Hill St. 3: t. 334. 1920. **(PLATE 43: 371)**

Common names: Black plum, Jambol, Jaman, Java plum (E); Nerale, Nerula, Neeram (K); Njara, Njaval, Perinnaral, Valiyanjaval (M); Neredom, Naval, Nava-maram (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Medium sized trees; bark white, light pink inside. Leaves to 18 x 8 cm, ovate, oblong, long-acuminate at apex, acute at base; nerves many, close, shining above; petiole 1.5-2 cm long. Panicles to 10 cm across, on leafless branchlets. Flowers 6-9 mm across, subsessile; calyx tube 3 mm broad, turbinate; filaments 7 mm long. Berry 10 x 7 mm, obovoid, deep blue.

Flowering & Fruiting: December - April.

Utility: Used in Ayurveda, Folk, Homeopathy, Tibetain and Unani medicine. A well known tree, whose fruits are edible. Besides fruits, its leaves, bark and seeds are used

in the form of powder (3-5 gms), decoction (50-100 ml) to treat diarrhoea, haemorrhage, vomiting, wound, diabetic disorder. It is also used for timber purposes.

Propagation: Seeds have short viability and maximum 1 month. Fresh fruits are brought to nursery, depulped manually, dried for a couple of days and sown in mother beds; germination is noticed from 20 to 30 days. Germination is about 50%.

Notes: Seen in all types of forests ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 16.03.1991, d 44 (Cairn Hills); PSU & NKK, Kodanad, 04.11.1994, 230 (TNFDH); KNS, Kotagiri, 20.04.1964, 1228 (FRC).

395. Syzygium densiflorum Wall. ex Wight & Arn., Prodr. 329. 1834; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 156.1987. *Syzygium arnottianum* (Wight) Walp., Rep. 2:180.1843. nom. superfl.; Gamble, Fl. Pres. Madras 475 (338). 1919. *Eugenia arnottiana* Wight, Ill. Ind. Bot. 2: 17. 1841; Hook. f., Fl. Brit. India 2: 483. 1878; Fyson, Fl. South Indian Hill St. 2: t. 109. 1932. *Eugenia benthamiana* Wight ex Duthie in Hook. f., Fl. Brit. India 2: 484. 1878. *Eugenia arnottiana* (Walp.) Wight var. *benthamiana* Wight ex Duthie in Hook. f., Fl. Brit. India 2: 484. 1878. *Syzygium benthamianum* (Wight ex Duthie) Gamble, Fl. Pres. Madras 478 (338). 1919. **(PLATE 43: 372, 372 a)**

Common names: Ayuri, Karayambuvu, Kuruthamaram, Kuruthal, Kurunjaval, Njaval, Pillanjaval (M); Naval, Nagay, Vellai-naval (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Evergreen trees, to 20 m high; bark surface blackish-grey, rough; branchlets terete. Leaves simple, opposite, estipulate; petiole 3-20 mm long, slender, grooved above, glabrous; lamina 3.5-9 x 1.8-3.7 cm, elliptic, elliptic-lanceolate or elliptic-oblong, base attenuate or acute, apex acuminate or caudate acuminate, margin entire, glabrous, glandular punctate, coriaceous, olive-green when dry; lateral nerves many, parallel, close, prominent, looped at the margin forming intramarginal nerve, intercostae reticulate, prominent. Flowers bisexual, creamy, 10-12 mm long, sessile, in dense clusters forming compact, terminal trichotomous cymes; calyx tube to 5 mm, turbinate; lobes 4; no thick disc; petals free, deciduous; stamens many free, bent inwards at the middle in bud; ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, oblong-ovoid, dark purple, fleshy.

Flowering & Fruiting: April - June.

Propagation: The seeds have short viability and maximum of one month, best to be sowed within a week, cant' be stored more than a month. Fresh fruits are brought to nursery, depulped manually dried for a couple of days and sown in mother beds. Germination is noticed from 20 to 30 days. Seeds showed 60 % germination.

Notes: A typical shola tree ± 1600 m, common in Thaishola.

PSU & NKK, Pykara, 10.03.1991, L a 85 (Cairn Hills); PSU & NKK, Kodanad, 02.08.1994, 285 (TNFDH); KNS, Aramby shola, 25.02.1977, 6688 (FRC).

396. Syzygium grande (Wight) Walp., Repert. Bot. Syst. 2: 180. 1843. *Eugenia grandis* Wight, Ill. Ind. Bot. 2: 17. 1841. *Eugenia montana* Wight, Ic. t. 1060. 1846, non Aubl. 1775; Hook. f., Fl. Brit. India 2: 488. 1878; Fyson, Fl. South Indian Hill St. 2: t. 111. 1932. *Syzygium montanum* (Wight) Gamble, Fl. Pres. Madras 479 (339). 1919, non Thw. 1859. *Syzygium tamilnadensis* Rathkr. & Chithra in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 158. 1983, nom. superfl. **(PLATE 43: 373)**

Common names: Kallunjaval, Poriyil (M).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Evergreen trees, to 20 m high, bark dark brown, peeling off in small flakes; branchlets tetragonous. Leaves simple, opposite, estipulate; petiole 5-16 mm, stout, grooved above, glabrous; lamina 3-12.5 x 2.5-7.5 cm, elliptic, obovate or elliptic-obovate, base cuneate, apex obtuse or emarginate, margin entire, glabrous, coriaceous, pellucid-dotted; lateral nerves many, parallel, slender, slightly distant, prominent, looped near the margin forming intramarginal nerve; intercostae reticulate, slender, faint. Flowers bisexual, 5 mm across, sessile, white, in axillary or terminal corymbose panicles, inflorescence branches stout; calyx tube 3 mm long, obconic; lobes 4; no thick disc; petals calyptrate; stamens many, bent inwards regularly middle in bud, filaments 5-6 mm long; ovary inferior, 2-celled; ovules many; style 1; stigma simple. Fruit a berry, 6-8 mm across, globose, purple, succulent, crowned by calyx limb.

Flowering & Fruiting: February - May.

Propagation: Seeds are short lived (1 month). Seeds can be sown in May to June. Germination percentage is 90% and germination period is of about 70 days.

Notes: A typical shola tree ± 2000 m, common in Governor shola.

PSU & NKK, Wenlockdowns, 27.01.1991, I d 46 (Cairn Hills); PSU & NKK, Kodanad, 20.10.1994, 202 (TNFDH).

397. Syzygium hemisphericum (Wight) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.):115. 1931; Chithra in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 156. 1983. *Eugenia hemispherica* Wight, Ic. t. 525. 1842; Hook. f., Fl. Brit. India 2: 477. 1878. *Jambosa hemispherica* (Wight) Walp., Rep. 2: 191. 1843; Gamble, Fl. Pres. Madras 474 (335). 1919. **(PLATE 43: 374)**

Common names: Bannerale, Pannerale; Gajanerale (K); Payanjaval, Tholnjaval, Venjara, Venyara (M); Vellainaval (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Trees; branchlets terete. Leaves simple, opposite; lamina 5.5-17.5 x 2-5 cm, elliptic, elliptic-lanceolate, elliptic-oblanceolate or ovate-lanceolate, base cuneate or acute, apex acute, acuminate or caudate-acuminate, margin entire, coriaceous, glabrous, pellucid-dotted; lateral nerves 8-16 pairs, pinnate, slender, obscure, looped near the margin forming intramarginal nerve, intercostae reticulate, obscure. Flowers bisexual, 3-4 cm across, white or rose, densely packed; pedicel 5 mm long; calyx tube 6 mm long, shortly and stoutly obconic, lobes 4, 3 x 6 mm, obtuse; disc thick; petals 4, 7 mm across, free; stamens many, bent inwards in middle regularly when in bud; filaments 15 mm long; ovary inferior, 2-celled, ovules many; style slender; stigma slightly acute. Fruit a berry, 23-25 mm across, globose, purple, crowned by calyx lobes.

Flowering & Fruiting: March - June.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam.

398. Syzygium lanceolatum (Lam.) Wight & Arn., Prodr. 330. 1834; Chithra in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 157. 1983. *Eugenia lanceolata* Lam., Encycl. 3: 200. 1789. *Syzygium wightianum* Wall. ex Wight & Arn., Prodr. 330. 1834; Gamble, Fl. Pres. Madras 478 (338). 1919. *Eugenia wightiana* (Wall. ex Wight & Arn.) Wight, Ic. t. 529. 1842; Hook. f., Fl. Brit. India 2: 485. 1878. *Syzygium claviflorum* sensu Shareef et al., Rheedea 20: 52. 2010, non (Roxb.) Wall. ex A.M. Cowan & Cowan, 1929. **(PLATE 43: 375)**

Common names: Njaval (M).

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Trees, to 12 m high, bark greyish-brown, smooth; branchlets terete. Leaves simple, opposite, estipulate; petiole 4-6 mm long, slender, grooved above, glabrous; lamina

7.5-12.5 x 2-3.7 cm, elliptic, elliptic-oblong, or elliptic-lanceolate, base cuneate or acute, apex obliquely acuminate or acute, margin entire, glabrous, chartaceous, pellucid-dotted; lateral nerves many, parallel, slender, not always close, obscure, looped at the margin forming intramarginal nerve, intercostae reticulate, obscure. Flowers bisexual, white, 5 mm across, in axillary and terminal cymes; pedicel to 2 mm; calyx tube 12 x 3 mm, elongate, funnel shaped, lobes 4, short; no thick disc; petal 4, often many, 3 x 3 mm, suborbicular; stamens many, bent inwards at the middle in bud, 6 mm long; ovary inferior, 2-celled; ovules many; style 1; stigma simple. Fruit a berry 10-12 mm long, ovoid-turbinate, bright scarlet.

Flowering & Fruiting: March - April.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

KNS, Ooty to Gudalur, 14.05.1963, 633 (FRC).

69. NYMPHAEACEAE

NYMPHAEA L.

399. Nymphaea nouchali Burm.f., Fl. Ind. 120. 1768; S.R. Srinivas. in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 9. 1983. *Nymphaea stellata* Willd., Sp. Pl. 2: 1153. 1799; Gamble, Fl. Pres. Madras 33 (24). 1915. **(PLATE 44: 376)**

Common names: Indian waterlily, Indian blue waterlily (E); Ampala, Ambel, Neerambel, Periambel, Poothali, Vellampel (M); Alli, Karuneythal, Nilotpalam (T).

Distribution: Indo-Malesia and Tropical Africa. *Habitat*: Aquatic.

Rhizomatous aquatic herbs. rhizomes often producing long runners. Leaves alternate, elliptic or orbicular, elliptic-sagitate when young, entire or irregularly sinuate at margin, rounded-acute at apex, 10-35 x 8-28 cm, reddish purple beneath; main nerves 7-15, palmate. Flowers 6-14 cm across, slightly fragrant. Sepals lanceolate to oblong-lanceolate, obtuse, green, streaked purple outside. Petals 8-15, elliptic-lanceolate, mauve. Stamens 20-60, yellow; outer ones 1.5-2.5 cm long; the inner shorter; connective appendages 1.5-3 mm long; anthers 0.5-1.5 cm long. Ovary urceolate, sunken, 10-20 loculed; ovules numerous on superficial placentae; stigmas 8-20, radiating, connate at base. Fruits globose, 1.5-3.5 cm, with remnants of sepals, petals and stamens; seeds ellipsoid-globose, 8-10 mm long, vertically fine-lined, ciliate on ribs, becoming glabrate with growth of aril.

Flowering & Fruiting: Throughout the year.

Utility: Used in Ayurveda and Folk medicine. Rhizome is demulcent and used in diarrhoea, dysentery and dyspepsia. Flowers are cardiotonic. Seeds are used in cutaneous diseases. Whole plant is used in burning sensation, thrist, boils, poisoning, menorrhagia, erysipelas, diseases of urinary tract, dermatopathy, general debility and diarrhoea.

Notes: Found in the reservoir ± 2050 m, common in Pykara falls.

PSU & NKK, Wenlockdowns, 20.02.1991, b 19 (Cairn Hills).

70. OLEACEAE

1. Climbing or scandent shrubs .... ***Jasminum***
1. Erect shrubs or trees **2**

2. Inflorescence terminal panicles .... ***Ligustrum***
2. Inflorescence axillary panicles **3**

3. Corolla of distinct petals; free or connate in pairs .... ***Chionanthus***
3. Corolla tubular or absent .... ***Olea***

CHIONANTHUS L.

400. Chionanthus ramiflorus Roxb., Fl. Ind. 1: 106. 1820; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 70.1987. *Linociera ramiflora* (Roxb.) G. Don, Gen. Hist. 4. 54. 1837-1838; Manilal, Fl. Silent Valley 172. 1988. *Linociera macrophylla* Wall. ex G. Don, Gen. Hist. 4:53.1837-1838; Hook. f., Fl. Brit. India 3: 610.1882; Gamble, Fl. Pres. Madras 795 (558).1923. *Chionanthus roxburghii* (Spreng.) Srivastava & Kapoor, Geophytology 11: 262. 1981 & Journ. Econ. Tax. Bot. 15: 139. 1991. *Olea roxburghii* Spreng., Neue Entdeck 5:78. 1822. *Olea paniculata* Roxb., Fl. Ind. 1:104. 1820, non R. Br. 1810. *Linociera intermedia* var. *roxburghii* (Spreng.) Clarke in Hook. f., Fl. Brit. India 3: 609.1882. *Chionanthus ramiflorus* Roxb. var. *peninsularis* Ravik. & Lakshm., Bull. Bot. Surv. India 31: 163. 1989. **(PLATE 44: 377)**

Common names: Madlae (K); Kaattuchakkalathi, Vellaedali (M); Perumsithudakki (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Trees, to 20 m high, bark 1.3 cm, light greyish-brown, minutely warty tubercled; blaze creamy-yellow; branchlets glabrous. Leaves simple, opposite, estipulate; petiole 20-30 mm long, slender, glabrous; lamina 5-20 x 2.5-6 cm, elliptic to obovate, base cuneate, apex acuminate, margin entire, glabrous, chartaceous; lateral nerves 6-8 pairs, pinnate, prominent, glabrous, intercostae reticulate. Flowers bisexual, white, in axillary or terminal panicles; pedicel 1 cm long; calyx lobes 4, acute, glabrous; corolla 3 mm long, lobes 4, connate in pairs, narrowly oblong; stamens 2, attached at the base of corolla lobes; filaments short; anthers dehiscing on margin; connective broad; ovary 2-celled, superior, glabrous, ovules 2 in each cell, pendulous from the apex; style short. Fruit a drupe, oblong, 1.2-2 cm long, black, glabrous; seed solitary.

Flowering & Fruiting: February - April.

Notes: Found in sholas border ± 2050 m, common in Ankinda.

JASMINUM L.

1. Leaves simple 2
1. Leaves compound 3

2. Calyx pubescent .... *J. coarctatum*
2. Calyx glabrous .... *J. cuspidatum*

3. Leaves 3-foliolate 4
3. Leaves imparipinnate .... *J. bignoniaceum*

4. Flowers yellow .... *J. mesnyi*
4. Flowers white 5

5. Leaves with the two lower leaflets very small and frequently wanting; branchlets and leaves fulvous-tomentose .... *J. brevilobum*
5. Leaves with all three leaflets similar, the lateral lobes little smaller than terminal; branchlets and leaves glabrous .... *J. flexile*

401. Jasminum bignoniaceum Wall. ex A. DC. in DC., Prodr. 8: 313. 1844; Gamble, Fl. Pres. Madras 791(556). 1923; Fyson, Fl. South Indian Hill St. 3: t. 415. 1920; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 71.1987. *Jasminum humile* sensu Clarke in Hook. f., Fl. Brit. India 3: 602. 1882. **(PLATE 44: 378)**

Common names: Kurumozhi, Pita (M); Mullu-gundu (T).

Distribution: Native of Europe; now widely cultivated in Nilgiris. *Habitat*: Roadsides and open areas.

Erect, at times scandent subshrubs; branchlets glabrous, shallowly angled from the base of 2 leaves above. Leaves alternate, odd-pinnate, glabrous; petiole to 3 cm; leaflets 4 or 5 pairs, elliptic, to 1.5 x 0.8 cm, base attenuate, recurved, apex acute, more or less sessile; petiolule of terminal leaflets 6 mm. Cymes leaf-opposed, subumbellate, to 5-flowered; peduncle to 2.5 cm. Flowers nodding; pedicels 1.5 cm; bracts linear; bracteoles 0. Calyx-tube 3 mm; lobes 5, triangular, 1.5 mm. Corolla yellow, 1 cm wide; tube 2 cm; lobes 5, ovate, over-lapping at base, recurved. Stamens 2. Berry paired, subglobose, 8 mm, black when ripe.

Flowering & Fruiting: March - June.

Utility: Used in Ayurveda and Unani medicine.

Notes: Naturalised in shola border ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, b 41 (Cairn Hills); PSU & NKK, Kodanad, 06.06.1994, 59 & 25.11.11994, 454 (TNFDH); KNS, Longwood, 08.05.1963, 499 (FRC).

402. Jasminum brevilobum A. DC. in DC., Prodr. 8: 307. 1844; Hook. f., Fl. Brit. India 3: 600. 1882; Gamble, Fl. Pres. Madras 791 (555). 1923; Fyson, Fl. South Indian Hill St. 2: t. 187. 1932; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 71.1987; P. S. Green, Kew Bull. 58: 278. 2003. **(PLATE 44: 379)**

Common names: Kattumulla (M).

Distribution: Peninsular India. *Habitat*: Shola forests.

Extensive liane; branchlets tawny- pubescent. Leaves 3-foliolate, subcoriaceous, fulvous-tomentose; petiole to 1 cm; odd leaflet deltoid, to 6.5 x 4.5 cm, base truncate, apex mucronate; lateral leaflets reduced to ca ¼th of the terminal one. Cymes corymboid, to 12-flowered, terminal or in upper axils; peduncle to 1 cm. Flowers sessile; bracts and bracteoles minute. Calyx-lobes 5, ovate. Corolla white, 2 cm wide; tube 3 cm; lobes 5(7), (ob)ovate, 1 cm, apiculate. Stamens 2. Ovary tomentose above. Berry globose, 1 cm wide.

Flowering & Fruiting: October - January.

Notes: Climbing on shola trees ± 1600 m, common in Thaishola.

PSU & NKK, Wenlockdowns, 27.01.1991, II b 42 (Cairn Hills); PSU & NKK, Kodanad, 06.06.1994, 56 (TNFDH); KNS, Longwood, 08.05.1963, 493 (FRC).

403. Jasminum coarctatum Roxb., Fl. Ind. 1: 91. 1820; P. S. Green, Kew Bull. 58: 289. 2003. *Jasminum rottlerianum* Wall. ex A. DC. in DC., Prodr. 8: 305. 1844; Hook. f., Fl. Brit. India 3: 593. 1882; Gamble, Fl. Pres. Madras 789(555). 1923; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 72.1987. *Jasminum rottlerianum* Wall. ex A. DC. var. *glabrior* Clarke in Hook.f., Fl. Brit. India 3: 593. 1882. **(PLATE 44: 380)**

Common names: Doddakadu-mallige (K); Kattumulla, Vellakattumulla (M); Malamullei, Kattumalligai (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Climbing shrubs, pubescent. Leaves 8 x 3 cm, ovate-lanceolate, apex acute to acuminate, villous; petiole 1 cm, pubescent. Cymes terminal and axillary, bracts ovate, bracteoles linear; calyx tube 2 mm, 7-lobed, 5 mm, linear, curled, pubescent; corolla tube 2.5 cm long, lobes 7, twisted,1.5 cm; ovary 1 mm across; style 7 mm, stigma clavate.

Flowering & Fruiting: January - June.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Naduvattam.

404. Jasminum cuspidatum Rottl., Ges. Naturf. Fr. Ber. n. s. 4: 192. 1803; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 71.1987. *Jasminum rigidum* Zenk., Pl. Ind. 5. t. 6. 1835; Hook. f., Fl. Brit. India 3: 598. 1882; Gamble, Fl. Pres. Madras 790 (555). 1923. **(PLATE 44: 381)**

Common names: Adaviyamalla (K); Urumikol (M); Usimallaigai (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Erect shrubs; stem subscandent, glabrous. Leaves 4-6 x 2-3 cm, lanceolate, rounded at the acute apex, round at base; nerves from the base and from midrib, distinct below; petiole 2-3 mm long. Cymes terminal or axillary, lax; peduncle 5-10 cm long, glabrous; bracts 1-2 mm long, subulate. Flowers 3-5 together; pedicel 5 mm long, stout; calyx tube 2 mm long, campanulate, glabrous, lobes 6 mm long, narrow; corolla tube 2-2.5 cm long, lobes 1.5-1.7 cm long, oblong, acute. Berry 8 x 7 mm, ovoid, glabrous.

Flowering & Fruiting: January - April.

Notes: Found in the shola floor ± 1600 m, common in Thaishola.

405. Jasminum flexile Vahl, Symb. Bot. 3: 1. 1794 & Enum. Pl. 1: 31. 1804, var. **flexile**; Hook. f., Fl. Brit. India 3: 601. 1882; Gamble, Fl. Pres. Madras 791(555). 1923. *Jasminum azoricum* sensu Mohanan, Fl. Quilon Dist. 248. 1984; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 71.1987. non Burm. f., 1768. *Jasminum flexile* Vahl var. *travancorense* Gamble, Fl. Pres. Madras 791(556). 1921. *Jasminum azoricum* L. var. *travancorense* (Gamble) M. Mohanan, Journ. Econ. Tax. Bot. 6: 480. 1985. **(PLATE 44: 382)**

Common names: River Jasmine, Scrambling Vine (E); Perumalli (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Climbing shrubs; stem glabrous. Leaflets subequal, 10 x 5 cm, ovate-lanceolate, base rounded, apex acuminate, glabrous, acumen curved, lateral nerves 7 pairs; petiolules unequal, middle petiolulate to 2.5 cm long, laterals smaller. Cymes to 15 cm long, terminal, corymbose, peduncled; bracts and bracteoles minute, subulate. Flowers many; pedicels 1.5 cm long; calyx 3 mm long, truncate, glabrous; corolla tube 3 cm long, lobes 13 x 6 mm, oblong, obtuse, white with pink tinge. Berry 10 x 5 mm, oblique-obovoid, black, glabrous.

Flowering & Fruiting: October - March.

Utility: Used in Ayurveda and Siddha medicine.

Notes: Found in shola border ± 1000 m, common in Kinnakorai.

PSU & NKK, Kalhatty, 27.03.1991, L b 31 (Cairn Hills); KNS, Coonoor, 23.02.1965, 6635 (FRC).

406. Jasminum mesnyi Hance, Journ. Bot. 20: 37. 1882; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 72.1987. *Jasminum primulinum* Hemsl. ex Baker, Bull. Misc. Inform. Kew 1895: 109. 1895. **(PLATE 44: 383)**

Common names: Japanese Jasmine, Primrose Jasmine (E).

Distribution: Native of China. *Habitat*: Cultivated as a hedge plant.

Shrubs twiggy, glabrous; branches 4-angled, overhanging. Leaves opposite, up to 10 cm long, petiolate, trifoliolate; leaflets sessile or subsessile, narrowly elliptic to oblong-lanceolate or oval, apiculate, dark green above, paler beneath, venation closed. Flowers scentless, solitary on axillary peduncles. Calyx short; lobes 6, ca 5 mm long. Corolla

bright yellow, orange in the throat, single or double, tube stout, lobes usually 6, obovate, rounded, ca 2.5 cm long. Fruit a didymous or simple berry, ellipsoid, up to 1 cm long and 6 mm in diameter, each part containing 1 or 2 seeds.

Flowering & Fruiting: September - March.

Notes: Planted as a hedge plant ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 05.07.1994, 81 (TNFDH).

LIGUSTRUM L.

1. Flowers small, corolla tube about as long as the calyx; drupe obovoid .... ***L. robustum***
1. Flowers rather large, corolla tube twice as long as the calyx; drupe ellipsoid ....***L. perrottetii***

407. Ligustrum perrottetii A. DC. in DC., Prodr. 8: 294. 1844; Hook. f., Fl. Brit. India 3: 615. 1882; Gamble, Fl. Pres. Madras 797 (560). 1923; Fyson, Fl. South Indian Hill St. 2: t. 189.1932; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 73.1987. *Ligustrum neilgherrense* Wight, Ic. t. 1243. 1848. *Ligustrum decaisnei* Clarke in Hook.f., Fl. Brit. India 3: 616. 1882; Gamble, Fl. Pres. Madras 798 (560). 1923. *Ligustrum gamblei* Ramam. in Saldanha & Nicolson, Fl. Hassan Dist. 515. 1976. *Ligustrum roxburghii* Clarke in Hook.f., Fl. Brit. India 3: 615. 1882, non Blume 1850, nec Hort. ex Decne. 1877; Gamble, Fl. Pres. Madras 797 (560). 1923. *Ligustrum robustum* (Roxb.) Bedd., For. Man. Bot. 154. 1873, non Blume 1850, nec Thw. 1860. *Phillyrea robusta* Roxb., Fl. Ind. 1:101.1820. *Ligustrum travancoricum* Gamble, Bull. Misc. Inform. Kew 1922: 119. 1922 & Gamble, Fl. Pres. Madras 797 (560). 1923. **(PLATE 44: 384)**

Common names: Cheepae, Kolee, Koli, Chandraka (K); Pinkan, Pingi, Kathikodimaram (M); Punganchedi (T).

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Large shrubs or smaller trees; branchlets with circular lenticels. Leaves 7-10 x 2-5 cm, acute to acuminate, glabrous; nerves 6-8 pairs, regular faint towards the margins; petiole 1 cm long. Panicle effuse, pubescent. Flowers many, closely packed; pedicel 1-2 mm long; calyx 2 mm long, lobes obovate; corolla white, 3-5 mm across, lobes ovate, obtuse, white; ovary conical, style short. Drupe 6-7 mm long, obovoid, obtuse.

Flowering & Fruiting: February - June.

Propagation: The seeds can be stored for three months. Dried seeds are winnowed; selected seeds are soaked in cow dung solution for overnight. The pretreated seeds are mixed with sands and spreaded in mother bed for germination. Germination takes place in about 60 days. Germination is of about 30%.

Notes: Found in the ecotone region of sholas and grasslands ± 1600 m, common in Thaishola.

PSU & NKK, Naduvattam, 02.02.1991, b 47 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 313 & 28.10.1994, 211 (TNFDH); KNS, Bangithapal, 12.05.1963, 646 (FRC).

408. **Ligustrum robustum** (Roxb.) Blume ssp. **walkeri** (Decne.) P. S. Green, Kew Bull. 40: 130. 1985 & Rev. Handb. Fl. Ceylon 270. 1987; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 73.1987. *Ligustrum walkeri* Decne., Nouv. Arch. Mus. Hist Nat. Paris 2: 27. 1879; Hook. f., Fl. Brit. India 3: 614. 1882; Gamble, Fl. Pres. Madras 797 (560). 1923. **(PLATE 45: 385)**

Common names: Chandraka, Kolee (K); Punganchedi (T).

Distribution: Sri Lanka and Peninsular India. *Habitat*: Shola forests.

Large shrubs or small trees; branchlets with elliptical lenticels. Leaves 6-10 x 4-5 cm, ovate, acute, punctate; nerves indistinct; petiole 1 cm long. Panicle loose, branches puberulus. Flowers distant; pedicel 2 mm long; calyx tube 2 mm long, 5-toothed; corolla 5 mm long; lobes longer than the tube, ovate, obtuse, white; ovary truncate at apex; stigma spathulate. Berry 7 mm long, obovoid.

Flowering & Fruiting: May - July.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Sispara.

PSU & NKK, Gethai, 02.02.1991, b 48 (Cairn Hills).

OLEA L.

409. **Olea paniculata** R. Br., Prodr. 523. 1810; Matthew, Kew Bull. 46: 545. 1991; Green, Kew. Bull. 57: 129. 2002; P. S. Green, Kew Bull. 58: 259. 2002. *Olea glandulifera* Desf., Cat. Pl. Hort. Paris (ed. 3) 88, 391. 1829. *Olea glandulifera* Wall. ex G. Don, Gen. Hist. 4: 49. 1837-1838; Hook. f., Fl. Brit. India 3: 612. 1882; Gamble, Fl. Pres. Madras 796 (559). 1923; P. Bhargavan in Henry et al.,

Fl. Tamil Nadu 2: 74.1987. *Olea bournei* Fyson, Bull. Misc. Inform. Kew 1914: 186. 1914; Fyson, Fl. South Indian Hill St. 2: t. 188. 1932. **(PLATE 45: 386)**

Common names: Kunde, Neravellu (K); Kundai, Perumpungu (T).

Distribution: India, Himalaya and Nepal. *Habitat*: Shola forests.

Trees, to 15 m high, bark 1 cm, greyish-brown, exfoliating in brittle scales; blaze dull yellow. Leaves simple, opposite, estipulate; petiole 10-35 mm, slender, glabrous, grooved above; lamina 7-13 x 2.5-5 cm, elliptic, elliptic-obovate or elliptic lanceolate, base attenuate, apex acuminate, margin entire, glabrous, chartaceous; lateral nerves 4-7 pairs, glabrous, pinnate, prominent; intercostae reticulate; domatia present. Flowers bisexual, creamy, 4 mm across, in terminal or lateral compound, trichotomous cymes; calyx 1 mm, glabrous, lobes triangular, gland-dotted; corolla deeply lobed; lobes 4, spreading, 2 mm long, tube 1 mm long; stamens 2, exserted; anther oblong; ovary 1 mm long, 2-celled, ovules 2 in each cell; style short; stigma capitate. Fruit a drupe, 1.5 x 0.8 cm, ovoid, brownish-black; seed one.

Flowering & Fruiting: February - April.

Utility: Used in Folk medicine.

Notes: A typical shola tree ± 2050 m, common in Pykara.

PSU & NKK, Glenmorgan, 27.01.1991, b 45 (Cairn Hills); KNS, Kodanad, 09.05.1963, 253 (FRC).

71. ONAGRACEAE

1. Leaves decussate; stamens 2; fruits indehiscent .... ***Circaea***
1. Leaves alternate or radical; stamens 8; fruit a capsule **2**

2. Marshy plants; calyx-tube not produced above ovary; lobes persistent in fruit; stigma globose .... ***Ludwigia***
2. Terestrial herbs; calyx-tube produced above ovary; lobes deciduous; stigma 4-fid ..... ***Oenothera***

CIRCAEA L.

410. Circaea alpinia L. ssp. **imaicola** (Asch. & Magn.) Kitamura, Fl. Afghanistan 279. 1960; R. Gopalan in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 167. 1983. *Circaea alpina* L. var. *imaicola* Asch. & Magn., Bot. Zeitung (Berlin) 28: 74. 1870. *Circaea alpina* L. var. *himalaica* Clarke in Hook.f., Fl. Brit. India 2: 589. 1879. *Circaea alpina* sensu Wight, Illustr. 2: t.101. 1850, non L.1753; Gamble, Fl. Pres. Madras 518 (366). 1919; Fyson, Fl. South Indian Hill St. 3: t. 342. 1920. **(PLATE 45: 387)**

Distribution: Temperate North Hemisphere. *Habitat*: Cultivated fields.

Herbs, 0.35-4.5 cm tall; subterranean rhizomes terminated by tubers. Plants pubescent, the stem with short recurved hairs, the axis of the inflorescence with glandular or recurved hairs. Leaves ovate to broadly ovate, less commonly orbicular ovate, acute to very short acuminate at the apex, broadly cuneate to subcordate but most commonly truncate or rounded at the base, subentire to prominently dentate, pubescent, at least on the veins above. Largest leaf blades 2-7 x 1.4-4.5 cm. Pedicels 0.6-2.5 mm, glabrous, erect or ascending at anthesis. Unilocular ovary with soft uncinate hairs. Floral tube up to 0.3 mm long. Sepals 2, glabrous, white or pink tinged only at the apex, spreading at anthesis. Petals 2, white or pink, narrowly to broadly obovate in outline. Stamens 2, erect or slightly spreading at anthesis, usually equalling the style. Style erect, Mature fruit unilocular, 1-seeded, clavate, tapering smoothly to the pedicel, densely covered with stiff uncinate hairs. Fruiting pedicels mostly spreading, less commonly slightly reflexed.

Flowering & Fruiting: September - December.

Utility: Used in Folk medicine.

Notes: Found in open places and marshy areas ± 2050 m, common in Finger post.

PSU & NKK, Kodanad, 25.11.1994, 246 (TNFDH); DG, Nilgiris, 149 (FRC).

LUDWIGIA L.

411. Ludwigia octovalvis (Jacq.) Raven ssp. **sessiliflora** (Michx.) Raven, Kew Bull 15: 476. 1962; R. Gopalan in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 168. 1983. *Jussiaea octonervia* forma *sessiliflora* Michx., Mart. Fl. Bars. 13: 171. 1875. *Jussiaea suffruticosa* L., Sp. Pl. 388. 1753; Hook. f., Fl. Brit. India 2: 587. 1879; Gamble, Fl. Pres. Madras 516 (365). 1919, non *Ludwigia suffruticosa* Walt. 1788. *Jussiaea villosa* Lam., Encycl. 3: 331. 1789. *Ludwigia octovalvis* (Jacq.) Raven, Kew Bull 15: 476.1962. **(PLATE 45: 388)**

Common names: False Primrose, Kamole, Primrose willow, Swamp Primrose (E); Kattugramb, Kattukarayambu, Kattuthumba (M); Kattukirambu, Kirambuppondu, Nirkirambu (T).

Distribution: Pantropical. *Habitat*: Marshy areas.

Erect herbs, to 1.5 m high, stem densely villous. Leaves to 7 x 1.5 cm, lanceolate, densely hairy; nerves many, oblique; petiole 5 mm long. Flowers axillary, sessile;

calyx lobes 4, 9 x 5 mm, ovate, acuminate, hispid; petals 10 x 7 mm, obovate, glabrous; anthers oblong; ovary hispid; disk 8-lobed, lobes clavate. Capsule 4.5 x 0.4 cm, linear, terete, hispid; seeds 0.6 x 0.6 mm, obliquely orbicular, muriculate, one side transversely rugose.

Flowering & Fruiting: May - November.

Utility: Used in Ayurveda medicine. Whole plant is useful in dyspepsia, verminosis, flatulence, strangury, dropsy, cough, asthma and neuropathy.

Notes: Found in water logged areas ± 2050 m, common in Pykara.

OENOTHERA L.

412. Oenothera rosea Ait., Hort. Kew. Ed. 1. 2: 3. 1789; Hook.f., Fl. Brit. India 2:582. 1879; Fyson, Fl. South Indian Hill St. 2: t. 182. 1932; Gamble Fl. Pres. Madras (517) 366. 1919; Fyson, Fl. South Indian Hill St. 3: t. 341.1920; R. Gopalan in N.C. Nair & Henry, Fl. Tamil Nadu India 1: 168. 1983. **(PLATE 45: 389)**

Distribution: Native of Peru. *Habitat*: Open areas and roadsides.

Perennial herbs; branches ascending, to 30 cm. Leaves ovate to ovate-lanceolate, to 7 x 2.2 cm, base narrow, subentire except at base where they are lobed to pinnatifid, acuminate, glabrous. Flowers axillary, diurnal, rose,1.8 cm wide. Hypanthium 5 mm, pinkish; lobes 4 errect. Petals 4 obovate, 1 x 1 cm, strongly veined. Stamens 8; filaments 5 mm. Ovary 4-celled, 8-ridged, ovules numerous, axile placentae; style 6 mm; stigma 4-cleft, each 5 cm capsules 8 ridged, club- shaped, 3x 0.5 cm; seeds numerous.

Flowering & Fruiting: April-October.

Notes: Naturalised in high range ± 2100 m, common in Ooty town.

PSU & NKK, Kodanad, 24.08.1994, 136 (TNFDH); D G, Nilgiris, 149 (FRC).

72. ORCHIDACEAE

1. Plants terrestrial **2**
1. Plants epiphytic or lithophytic **11**

2. Plants with distinct subterranean tubers **3**
2. Plants with no distinct subterranean tubers; sometimes psedobulb **7**

3.	Lip with spur or sac	4
3.	No spur or sac on lip	*Disperis*
4.	Lip with two spurs beside each other	*Satyrium*
4.	Lip with one spur or sac	5
5.	Stigma lobes not freely extending in frond of colum	6
5.	Two stigma lobes each on a stigmaphore extending from the column, not adnate to hypochile of lip; spur long	*Habenaria*
6.	Flowers large ca 6-10 cm in diameter	*Pecteilis*
6.	Flowers much smaller; lip with short spur; ovary usually erect, close to rachis	*Peristylus*
7.	Small dense flowers arranged in a neat spiral	*Spiranthes*
7.	Flowers not arranged in a neat spiral	8
8.	Lip with spur or sac, or deeply concave hypochile	9
8.	No spur or deep concave hypochile	10
9.	Hypochile deeply concave with two papillae inside epichile, deeply fringed sepals connate half way up	*Cheirostylis*
9.	Hypochile with a true spur	*Calanthe*
10.	Column short, stout; flowers non resupinate	*Seidenfia*
10.	Column long, slender; flowers resupinate	*Liparis*
11.	Small plants with equitant laterally compressed leaves; terminal inflorescences with very many minute flowers	*Oberonia*
11.	Leaves not laterally compressed but dorsally ventral or terete or reduced to scales	12
12.	Normal dorsi-ventral leaves	13
12.	Leaves terete	23
13.	Pseudobulbs or fleshy stems; sympodial plants	14
13.	Stems not pseudobulbous or fleshy; monopodial plants	19
14.	Pseudobulbous or fleshy stems with 2 or more leaves	15
14.	Pseudobulbous or fleshy stems with a single leaf	18
15.	Pollinia 8	16
15.	Pollinia 2-4	17
16.	Pseudobulb reticulated	*Eria*
16.	Pseudobulb smooth ovoid	*Conchidium*
17.	Column with a raised hood behind the anther	*Coelogyne*
17.	Column without a raised hood behind the anther	*Dendrobium*

18. Inflorescence branching; lip immovably joint to the column .... ***Sirhookera***
18. Inflorescence unbranched; lip very movable joint to the column ....***Bulbophyllum***

19. Lip with two short obtuse sacs besides each other .... ***Diplocentrum***
19. Lip with a single sac or spur, or no such sac or spur **20**

20. Lip with a raised toungh at back of wall of spur, closed to the base of the column .... ***Trichoglottis***
20. Lip with not a raised toungh at back of wall of spur, closed to the base of the column **21**

21. Mouth of the spur closed .... ***Cleisostoma***
21. Mouth of the spur not closed **22**

22. Column foot present; lip some what movable; stipes of pollinia linear .... ***Aerides***
22. Column foot absent; lip not movable; stipes of pollinia short or broad .... ***Robiquetia***

23. Many small yellow flowers; lip with a large sac .... ***Seidenfadeniella***
23. A few purplish fleshy flowers on a very short scape; lip without a sac and not spurred, fleshy .... ***Luisia***

AERIDES Lour.

1. Flowers large, ca 2.5 cm wide; mid-lobe triangular, erose; spur projecting forwards below, the lip subcylindrical ....***A. crispa***
1. Flowers small, ca 1.2 cm wide; mid-lobe ovate, entire; spur projecting donwards below, more or less funnel-shaped .... ***A. ringens***

413. Aerides crispa Lindl., Gen. Sp. Orchid. Pl. 239. 1833; Hook. f., Fl. Brit. India 6: 45. 1890; Gamble, Fl. Pres. Madras 1442 (1008). 1928; Fyson, Fl. South Indian Hill St. 2: t. 248. 1932; Abraham & Vatsala, Introd. Orchids 446. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 3.1989. *Aerides lindleyana* Wight, Ic. 5:9, t.1677. 1852. **(PLATE 45: 390)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Epiphytic shrubs, sometimes lithophytic. Stem 20-30 cm high, 1-1.5 cm diam, older stem covered with persistent sheaths of petioles. Leaves 10-20 x 2-3 cm, linear-oblong, unequally 2-lobed at tip, sheathing at base, keeled along midrib, deciduous above sheathing petiole. Inflorescence simple or branched racemes. Peduncles 10-20 cm long. Floral bracts minute, scaly. Flowers pink, 1.5-1.8 cm across. Sepals and petals 0.7-0.8 x 0.3-0.4 cm. Petals slightly smaller. Lip 1.5-1.8 x 0.3-0.4 cm, lobed; side lobes very small, mid-lobe ovate-crenulate. Pedicel and ovary 0.8-1.2 cm long.

Flowering & Fruiting: June - September.

Utility: Used in Folk medicine.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

PSU & NKK, Nanjanad, 12.02.1991, a 65 (Cairn Hills); PSU & NKK, Kodanad, 08.08.1995, 114 (TNFDH).

414. Aerides ringens (Lindl.) C.E.C. Fisch., Bull. Misc. Inform. Kew 1928: 284. 1928 & Gamble, Fl. Pres. Madras 1442 (1008). 1928; Abraham & Vatsala, Introd. Orchids 446. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 4.1989. *Saccolabium ringens* Lindl., Gen. Sp. Orchid. Pl. 221. 1833. *Aerides radicosa* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 65. 1841; Hook. f., Fl. Brit. India 6: 46. 1890; Fyson, Fl. South Indian Hill St. 2: t. 249. 1932. *Saccolabium paniculatum* Wight, Ic. t. 1676. 1851. *Aerides lineare* Hook. f., Fl. Brit. India 6: 47. 1890. **(PLATE 45: 391)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic shrubs. Leaves 13-15 x 0.5 cm, linear, keeled, obliquely bilobulate. Flowers white with pink, 2 x 1.5 cm, in about 20 cm long, lax racemes; dorsal sepal 8 x 3 mm, oblong-ovate, acute, 5-veined; laterals 5 x 3.5 mm, broadly ovate, acute, 5-veined; petals 6 x 3 mm, oblong, obtuse, 5-veined; lip 6 x 2 mm, ovate, acute, side lobes oblong or orbicular small, mid-lobe linear-oblong, acute; disc with fleshy callus; spur 6 x 2 mm, cylindrical.

Flowering & Fruiting: June - July.

Notes: Epiphytic on shola trees ± 2000 m, common in Governor shola.

PSU & NKK, Wenlockdowns, 26.01.1991, L c 30 (Cairn Hills); KNS, Kodanad, 08.05.1963, 447 (FRC).

BULBOPHYLLUM Du Petit-Thous.

1. Inflorescence racemose .... *B. elegantulum*
1. Inflorescence subumbellate .... *B. fischeri*

415. Bulbophyllum elegantulum (Rolfe) J. J. Smith, Bull. Buit. ser. 2, 8: 23. 1912. *Cirrhopetalum elegantulum* Rolfe, Gard. Chron. 9: 552. 1891; Gamble, Fl. Pres. Madras 1421 (993). 1928; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 5.1989. **(PLATE 45: 392)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs. Pseudobulb ovoid, ridged, distantly placed, 2 x 1 cm, Leaves solitary, 6-9 x 1 cm, linear-oblong, obtuse, emarginate at apex; petiole to 1 cm long. Flowers 4-6, deep pink, in 6-8 cm long slender peduncle; bracts 3.8-5.5 x 1.1 mm, lanceolate, acute, 3-veined; pedicel 2.5-4 mm long; dorsal sepal 3-6.5 x 2-3 mm, elliptic, apiculate, 5-veined, puberulus, hooded; lateral sepals 9.5-13 x 2-4 mm, oblong, lanceolate, acute, 5-veined, connate along the dorsal margins, papillate near the base; petals 2-3.5 x 1-2.5 mm, elliptic, obovate-oblong, obtuse, 3-veined, speckled with brown spots; lip 2-3.5 x 1 mm, ovate, oblong, obtuse, slightly curved.

Flowering & Fruiting: May - June.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

416. Bulbophyllum fischeri Seidenf., Dansk Bot. Ark. 29: 202. 1973; Abraham & Vatsala, Introd. Orchids 341. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 4.1989. *Phyllorkis gamblei* (Hook.f.) Kuntze, Revis. Gen. Pl. 2: 677. 1891. *Cirrhopetalum gamblei* Hook. f., Fl. Brit. India 5: 778. 1890; Gamble, Fl. Pres. Madras 1420 (993). 1928. *Bulbophyllum gamblei* (Hook.f.) J.J.Sm., Bull. Jard. Bot. Buitenzorg, II, 8: 24. 1912, nom. illeg. *Cirrhopetalum thomsonii* Hook. f., Fl. Brit. India 5: 778. 1890; Abraham & Vatsala, Introd. Orchids 343. 1981.

Distribution: South India, Sri Lanka and Laos. *Habitat*: Shola forest.

Epiphytic herbs. Pseudobulb ovoid, ridged, 1 x 1 cm, distantly placed. Leaves solitary, 4-5.5 x 1-1.5 cm, elliptic-oblong or linear-oblong, base subacute; petiole 1 cm long, obtuse, emarginate at apex. Flowers 4-8, yellow, in 5-8 cm long slender peduncle; bracts 4-5.5 x 1-2.6 mm, elliptic, acute, 5-veined; dorsal sepal 3.5-7.5 x 2-4 mm, ovate or elliptic, acute, 5-veined, puberulus, hooded; lateral sepals 11-20 x 3-4.1 mm, linear-lanceolate, subacuminate, 5-veined, puberulus near the base; petals 1.9-4.5 x 1.5-3 mm, elliptic-oblong or orbicular, obtuse, 3-veined; lip 4 x 1-2 mm, ovate, oblong, obtuse, curved.

Flowering & Fruiting: October - November.

Notes: Epiphytic on shola trees ± 1600 m, common in Thaishola. Gray et al., (1994) separated *Cirrhopetalum* and some smaller genera are separated from *Bulbophyllum* and he included this species under *Cirrhopetalum gamblei* Hook. f.

CALANTHE R. Br.

417. Calanthe sylvatica (Thouars) Lindl., Gen. Sp. Orchid. Pl. 250. 1833. *Centrosis sylvatica* Thouars, Orch. Iles. Aust. Afr. t. 35,36. 1822. *Bletia masuca* D. Don, Prodr. Fl. Nepal. 30. 1825. *Calanthe masuca* (D. Don) Lindl., Gen. Sp. Orchid. Pl. 249. 1833; Hook. f., Fl. Brit. India 5: 850. 1890; Gamble, Fl. Pres. Madras 1432 (1001). 1928; Abraham & Vatsala, Introd. Orchids 265. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 6.1989. **(PLATE 45: 393)**

Common names: Thenvaazhachedi (M).

Distribution: Widespread from in Africa, Madagascar and Indo-Malesia. *Habitat*: Shola forests.

Terrestrial herbs; stem not pseudobulbous at base. Leaves many, 25-50 x 5-8 cm, ovate-lanceolate, acuminate at apex, attenuate at base to sheathing petiole, 10-15 cm long, 7-9 ribbed, plicate. Inflorescence terminal racemes, 30-60 cm high. Flowers towards tip of peduncle, basal portion with 2-3 tubular sheaths; floral bracts 1.5-2 cm long, 0.2-0.3 cm wide, clavate. Flowers 3-4 cm across. Sepals and petals ovate, 1.5-2 x 0.8-1 cm, purple. Lip 1.5-2 cm long, 3-lobed, side lobes small, mid-lobe 2 fid, deep violet; spur 2- 2.5 cm long, slender. Pollinia 8, in groups of 4. Column short. Capsule 2.5-3 x 1-1.5 cm, broadly oblong.

Flowering & Fruiting: August - December.

Notes: Found in humus rich shola floor ± 1800 m, common in Naduvattam.

PSU & NKK, Kinnakorai, 18.02.1991, a 55 (Cairn Hills).

CHEIROSTYLIS Bl.

418. Cheirostylis flabellata (A. Rich.) Wight, Ic. 16. 1851 (as *Monochilus flabellatum* t. 1727); Hook. f., Fl. Brit. India 6: 105. 1890; Fyson, Fl. South Indian Hill St. 1: 398. 1932; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 6.1989. Gamble, Fl. Pres. Madras 1454 (1017). 1928; Abraham & Vatsala, Introd. Orchids 194. 1981. *Goodyera flabellata* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 79. t. 12. 1841. *Monochilus flabellatum* Wight, Ic. t. 1727. 1851. **(PLATE 46: 394)**

Distribution: South India, Sri Lanka, Bhutan and Myanmar. *Habitat*: Shola border.

Slender herbs, 5-10 cm high. Leaves 1-2.5 x 0.5-1 cm, ovate, acuminate at apex; petiole 1-1.5 cm long, sheathing on stem. Inflorescence terminal racemes, 5-6 cm

high, with 2-3 subulate bracts on rachis; flowers at top only. Floral bracts minute, subulate. Pedicel twisted and flowers resupinate. Sepals connate to a tube, 0.25-0.3 cm long. Petals free. Lip 0.5-0.6 cm long; lateral lobes saccate; mid-lobe 2-fid, 3-sect on margins. Capsules subglobose, 0.45-0.5 cm diam.

Flowering & Fruiting: February - May.

Notes: Found in the ecotone region of sholas and grasslands ± 2000 m, common in Kodanad.

CLEISOSTOMA Bl.

419. Cleisostoma tenuifolium (L.) Garay, Bot. Mus. Leafl. Harvard Univ. 23: 175. 1972. *Epidendrum tenuifolium* L., Sp. Pl. 952. 1753. *Sarcanthus peninsularis* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 343. 1851; Hook. f., Fl. Brit. India 6: 67. 1890; Gamble, Fl. Pres. Madras 1447 (1012). 1928. *Sarcanthus pauciflorus* Wight, Ic. t. 1747. 1851; Abraham & Vatsala, Introd. Orchids 471. 1981. **(PLATE 46: 395)**

Distribution: South West India and Thailand. *Habitat*: Shola forests.

Epiphytic shrubs to 20-30 cm long. Leaves 10-12 x 0.5 cm, linear, strongly keeled, acute. Flowers yellow, in 3-6 cm long, leaf-opposed racemes; dorsal sepal 4.5 x 1.2 mm, obovate-oblong, lanceolate, acute, 3-veined; lateral sepals 3 x 1 mm, elliptic, acute, 3-veined; petals 3 x 0.8 mm, falcately-oblong, truncate, 1-veined; lip 2 x 4 mm, 3-lobed, side lobes 1.5 x 1 mm, ovate, apiculate, midlobe, 2 x 1 mm, ovate, with 2 fleshy calli; spur 3 x 1 mm, oblong-ovoid.

Flowering & Fruiting: July - August.

Utility: Used in Folk medicine.

Notes: Epiphytic on shola trees ± 2050 m, common in Pykara.

COELOGYNE Lindl.

1. Lip with 2 entire laminate keels .... ***C. mossiae***
1. Lip with 3-5 keeled **2**

2. Mid lobe of lip triangular- lanceolate, acute, 3 long crenulate keels .... ***C. nervosa***
2. Mid lobe of lip ovate-oblong or suborbicular, rounded, 3 entire keels .... ***C. odoratissima***

420. Coelogyne mossiae Rolfe, Bull. Misc. Inform. Kew 1894: 156. 1894; Gamble, Fl. Pres. Madras 1430 (1000). 1928; Abraham & Vatsala, Introd. Orchids 285. 1981; Fyson, Fl. South Indian Hill St. 2: t. 247. 1932; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 7. 1989. **(PLATE 46: 396)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs; rhizome creeping. Pseudobulbs 4-5.5 x 2-2.5 cm, ovoid-conical, covered with ovate-lanceolate bracts, 4-5 x 2.5-3 cm. Leaves 2 per bulb, 10-14 x 3-4 cm, elliptic-lanceolate, acute at apex, narrowed at base; mid-rib and about 8 nerves prominent. Flowers terminal to new shoots, covered with leafy bracts. Floral bracts 3.5-4 x 0.8-1.2 cm, ovate lanceolate, scarious. Flowers white, 3.5-4 cm across. Sepals and petals subequal, 1.5 cm long, 0.8-1 cm wide. Lip 1.5-2 cm long, ovate-oblong; column 0.8-1 cm long; foot 0; Pollinia 4. Pedicel and ovary 1.2-1.5 cm long.

Flowering & Fruiting: August - October.

Notes: Epiphytic on the rocky slopes ± 2000 m, common in Kodanad.

PSU & NKK, Naduvattam, 12.02.1991, a 57 (Cairn Hills).

421. Coelogyne nervosa A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 16. 1841; Gamble, Fl. Pres. Madras 1430 (1000). 1928; Abraham & Vatsala, Introd. Orchids 285. 1981; Fyson, Fl. South Indian Hill St. 2: t. 246. 1932; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 7.1989. *Coelogyne corrugata* Wight, Ic. t. 1639. 1851; Hook. f., Fl. Brit. India 5: 835. 1890. **(PLATE 46: 397)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs. Pseudobulb subglobose to ovoid; wrinkled. Leaves 2 per pseudobulb, 6-15 x 2-2.5 cm, oblong-lanceolate, acute; petiole 2-3 cm long. Flowers white, in 8-12 cm long, 3-4-flowered raceme from the middle of leaves; bracts 12 x 19 mm, ovate, acute; dorsal sepal 26 x 9 mm, oblong or elliptic, acute, to apiculate, 9-veined; lateral sepals 29 x 9 mm, oblong-elliptic, acute, apiculate, 9-veined; petals 27 x 9 mm, elliptic, acute at both ends, 5-veined; lip 24 x 7-15 mm, ovate, acute, trilobed, side lobes, obliquely ovate.

Flowering & Fruiting: June - July.

Notes: Epiphytic on the rocky slopes ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 20.09.1991, a 58 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 427 (TNFDH).

422. Coelogyne odoratissima Lindl., Gen. Sp. Orchid. Pl. 41. 1830; Hook. f., Fl. Brit. India 5: 834. 1890; Gamble, Fl. Pres. Madras 1430 (1000). 1928; Abraham & Vatsala, Introd. Orchids 277. 1981; Fyson, Fl. South Indian Hill St. 2: t. 156. 1932; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 8.1989. *Coelogyne angustifolia* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 16. 1841. **(PLATE 46: 398)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic herbs. Pseudobulbs crowded, subglobose, formed at the bases of shoots after flowering, wrinkled when old, green, covered by hyaline sheaths. Leaves 1 or 2 to each pseudobulb, small at time of flowering, becoming larger and longer at fruiting, linear-lanceolate, acute, coriaceous, recurved and punctulate beneath. Flowering shoot arising from the base of the pseudobulb, with five imbricate basal sheaths and two small foliage leaves, from the centre of which emerges the terminal racemes bearing 2-4 flowers; floral bracts orbicular-ovate, acute, membranous, persistent and about 12-veined. Flowers 3.5 cm across, very fragrant, white. Dorsal sepal oblong-lanceolate, subacute, 9-veined; lateral sepals oblong-lanceolate or oblong-ovate, 5-veined, all sepals ridged dorsally in the midline. Petals linear, acute, 3-veined. Lip 3-lobed, 9-veined; lateral lobes oblong, obtuse, erect; midlobe orbicular, apiculate, with three crisped ridges along the midline; column 1.4 cm high, 3 mm broad, winged, bending over at the apex, mentum inconspicuous. Anther terminal, 2-loculed; pollinia 4, depressed inside. Ovary with pedicel 9 mm long. Fruit a capsule, 1.5-2.7 x 1-1.4 cm, ellipsoid, 6-ribbed, pendulous at the ends of thick, elongated peduncles.

Flowering & Fruiting: February - May.

Notes: Epiphytic on shola trees ± 2000 m, common in Kodanad.

PSU & NKK, Porthimund, 13.02.1991, a 59 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 103 (TNFDH); KNS, Dodabetta, 11.05.1963, 548 (FRC).

CONCHIDIUM Lindl.

1. Flowers white, tinged with pink, solitary on 2-4 cm long slender scape from the pseudobulb .... ***C. braccatum***
1. Inflorescence terminal racemes, 2-3 flowered, white .... ***C. nanum***

423. Conchidium braccatum (Lindl.) Brieger, Schlechter Orchideen 1: 751. 1981. *Dendrobium braccatum* Lindl., Gen. Sp. Orchid. Pl. 75. 1830. *Eria braccata* (Lindl.) Lindl., J. Proc. Linn. Soc. Bot. 3: 46.1859; Hook. f., Fl. Brit. India 5: 787.

1890; Gamble, Fl. Pres. Madras 1425 (996). 1928; Fyson, Fl. South Indian Hill St. 2: t. 243. 1932. *Eria reticosa* Wight, Ic. t. 1637. 1851; Hook. f., Fl. Brit. India 5: 787. 1890; Abraham & Vatsala, Introd. Orchids 373. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 11.1989. **(PLATE 46: 399)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic herbs. Pseudobulbs discoid, 6-10 mm diameter, reticulated. Leaves 2 per pseudobulb, 2-7 x 0.5-1.5 cm, oblanceolate to oblong-lanceolate, apex acute-apiculate, membranous. Flowers white, tinged with pink, solitary on 2-4 cm long slender scape from the pseudobulb; dorsal sepal 16-19 x 6-7 mm, oblong-lanceolate, obtuse, 7-veined; lateral sepals 16-20 x 6-11 mm, obliquely ovate-lanceolate, acute, 7-veined; petals 15-19 x 6 mm, oblong-lanceolate, subacute, 5-veined; lip 16-19 x 5-9 mm, elliptic-oblong or ovate, obtuse emarginate at apex; disc with 2 white ridges reaching subapically.

Flowering & Fruiting: July - October.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 03.03.1991, a 64 (Cairn Hills).

424. Conchidium nanum (A.Rich.) Brieger, Schlechter Orchideen 1: 751. 1981. *Eria nana* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 11: 19.1842; Hook. f., Fl. Brit. India 5: 789.1890; Gamble, Fl. Pres. Madras 1425 (996). 1928; Fyson, Fl. South Indian Hill St. 2: t. 244. 1932; Abraham & Vatsala, Introd. Orchids 377. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 11.1989. *Pinalia nana* (A.Rich.) Kuntze, Revis. Gen. Pl. 2: 679. 1891. *Eria muscicola* (Lindl.) Lindl. var. *ponmudiana* M. Mohanan & Henry, Journ. Econ. Tax. Bot. 8: 425. 1986. **(PLATE 46: 400)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small epiphytic herbs, pseudobulbs subglobose-discoid, 0.2-0.4 cm diam, enclosed in a fibrous sheath. Leaves 2, from top of pseudobulb, 1-1.5 x 0.2-0.3 cm, linear to oblanceolate, acute at apex, attenuate at base. Inflorescence terminal racemes, 2-3 flowered; bracts linear, 0.3 cm long. Flowers white, 0.4-0.5 cm across. Sepals and petals 0.5-0.6 cm long, lanceolate, acuminate at tip. Lip 0.3-0.4 cm long, not-lobed. Column ca 0.1 cm long. Pollinia 8, in 2 bundles. Pedicel with ovary 0.25 cm long.

Flowering & Fruiting: July - October.

Notes: Epiphytic on shola trees ± 1600 m, common in Thaishola.

DENDROBIUM Sw.

1. Flowers white, in about 5 cm long, terminal flexuous racemes .... ***D. microbulbon***
1. Flowers pinkish-white, to 8 cm terminal racemes .... ***D. nanum***

425. Dendrobium microbulbon A. Rich., Ann. Sci., Nat. ser. 2, 15: 19. t. 8. 1841; Hook. f., Fl. Brit. India 5: 716. 1890; Gamble, Fl. Pres. Madras 1415 (990). 1928; Abraham & Vatsala, Introd. Orchids 358. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 9.1989. *Dendrobium humile* Wight, Ic. t. 1643. 1851. *Dendrobium crispum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 111. 1852. **(PLATE 46: 401)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs. Pseudobulbs ovoid, 1.5 x 1 cm, scaly. Leaves 8 x 2 mm, linear-long, acute at apex, conduplicate at base, thin membranous. Flowers white, in about 5 cm long, terminal flexuous racemes; bracts 2.1 x 1.1 mm, ovate, cuspidate; dorsal sepal 6.1 x 1.1 mm, ovate-oblong, obtuse, 3-veined; lateral sepals 6 x 3 mm, ovate, obtuse, 3-veined; petals 6 x 1.5-2 mm, falcately oblanceolate, obtuse, 3-veined; lip greenish, 5 x 4 mm, trilobed, sessile; midlobe orbicular, truncate, thick, wrinkled, retuse at apex, disc with thick calli, truncate, retuse at apex.

Flowering & Fruiting: December - July.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 17.08.1994, 128 (TNFDH).

426. Dendrobium nanum Hook.f., Ic. Pl. t. 1853. 1889; Hook. f., Fl. Brit. India 5: 717. 1890; Gamble, Fl. Pres. Madras 1415 (990). 1928; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 9.1989. *Dendrobium mabelae* Gammie, Journ. Bombay Nat. Hist. Soc. 16: 567. 1905. **(PLATE 46: 402)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small herbs; pseudobulbs ovoid, covered with basal portion of leaves. Leaves 3 or 4, 3 x 1.2 cm, lanceolate-elliptic. Racemes to 8 cm; flowers 6-8, pinkish white; bracts 0.5 cm, lanceolate; sepals to 8 mm; mentum to 5 mm; lip tri-lobed, narrowed to a short stalk; lateral lobes narrow, shortly pectinate; ovary with pedicels to 1 cm.

Flowering & Fruiting: September - August.

Notes: Epiphytic on shola trees ± 1900 m, common in Avalanche.

PSU & NKK, Coonoor, 04.02.1991, a 60 & Outcherloney, 25.08.1991, a 61 (Cairn Hills).

DIPLOCENTRUM Lindl.

427. Diplocentrum recurvum Lindl., Bot. Reg. sub t. 1522. 1832. & Gen. Sp. Orchid. Pl. 218. 1833; Hook. f., Fl. Brit. India 6: 78. 1890; Gamble, Fl. Pres. Madras 1449 (1013). 1928; Abraham & Vatsala, Introd. Orchids 469. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3:10.1989. *Diplocentrum longifolium* Wight, Ic. t. 1681. 1852. **(PLATE 47: 403)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic herbs. Stem 6-8 cm long. Leaves linear, 15-20 x 0.4 cm, keeled, or subterete, obtuse, mucronate. Flower pink, in branched 25-35 cm long racemes; dorsal sepal 3 x 1.1 mm, oblanceolate, bimucronate, 3-veined; lateral sepals 4 x 2 mm, falcately oblong, lanceolate, obtuse, 3-veined; petals 3 x 1.5 mm, oblong-lanceolate, subacute, 3-veined; lip 6.9 x 3 mm, oblong-lanceolate, obtuse, 7-veined, with 2 collateral spurs; disc with a fleshy ridge, forking at apex.

Flowering & Fruiting: May - June.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

DISPERIS Sw.

428. Disperis neilgherrensis Wight, Ic. t. 1719. 1851; Hook. f., Fl. Brit. India 6: 169. 1890; Fyson, Fl. South Indian Hill St. 3: t. 527. 1920; Gamble, Fl. Pres. Madras 1478 (1032). 1928; Abraham & Vatsala, Introd. Orchids 208. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 10.1989. *Disperis zeylanica* Trimen, J. Bot. 23: 245. 1885; Hook. f., Fl. Brit. India 6: 169. 1890. **(PLATE 47: 404)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Terrestrial herbs with a tuber, stem 10-15 cm tall. Leaves to 10 x 9 mm, ovate, cordate, acute, sessile. Flowers pale-pink or rose, one or two in terminal raceme. Floral bracts, foliaceous, 9 x 6 mm, cordate, acute. Dorsal sepal and petals connated to form a hood over the column; dorsal sepal 9 x 2 mm, linear-lanceolate, 3-veined; lateral

sepals 16 x 7 mm, obliquely obovate, obtuse, many-veined; petals 10 x 6 mm, obliquely obovate or elliptic, subacute, 3-veined; lip 5 x 5 mm, anchor shaped, bifid, with two long linear recurved arms with yellow papillae.

Flowering & Fruiting: May - June.

Notes: Found in grasslands ± 2050 m, common in Pykara.

ERIA Lindl.

1. Flowers white, in 1.5-2 cm long, 2-flowered terminal raceme................................ ***E. pauciflora***
1. Flowers yellowish, in 10-15 cm long, many-flowered terminal raceme .... ***E. polystachya***

429. Eria pauciflora Wight, Ic. t. 1636. 1851; Hook. f., Fl. Brit. India 5: 799. 1890; Gamble, Fl. Pres. Madras 1425 (996). 1928; Abraham & Vatsala, Introd. Orchids 377. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 11.1989. **(PLATE 47: 405)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs. Stem clavate, 8-10 cm tall. Leaves 2, 4-6 x 1 cm, oblong-lanceolate, acute. Flowers white, in 1.5-2 cm long, 2-flowered, terminal raceme; bracts 6 x 3 mm, oblong-lanceolate, acute, 3-veined; dorsal sepal 7.5 x 2.8 mm, obovate-oblong, acute, 3-veined; lateral sepals 10 x 5.5-7 mm, obliquely ovate, acute; petals 8.5 x 2 mm, oblong-lanceolate, subacute-obtuse, 3-veined; lip 6.5 x 3.6 mm, quadrate, emarginate at apex; disc with fleshy bilobed calli; midlobe with 3 fleshy ridges.

Flowering & Fruiting: August - September.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

430. Eria polystachya A. Rich., Ann. Sci. Nat. Bot. ser. 2, 11: 20. t.9. 1841; Hook. f., Fl. Brit. India 5: 793. 1890; Gamble, Fl. Pres. Madras 1425 (996). 1928; Abraham & Vatsala, Introd. Orchids 382. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 11. 1989. **(PLATE 47: 406)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs. Pseudobulb 2-3 cm long, covered with sheaths. Leaves 13-16 x 2 cm, oblong, acute. Flowers yellowish, in 10-15 cm long, many-flowered, terminal raceme; dorsal sepal 7.1 x 1.2 cm, linear-lanceolate, acute, 3-veined; lateral sepals 6 x 1-2 cm, falcately ovate-lanceolate, acute, 3-veined; lip 3 x 0.8-1 mm, oblong, lanceolate, subacute, disc with 2 ridges at base, 3-veined.

Flowering & Fruiting: December - January.

Notes: Epiphytic on shola trees ± 1600 m, common in Thaishola.

HABENARIA Willd.

1.	Petals 2-lobed	2
1.	Petals entire	4
2.	Stem with upward leaves above	3
2.	Stem with leaves near the base	***H. rariflora***
3.	Smaller, leaves shorter and broader; raceme dense-flowerd	***H. digitata***
3.	Robust, leaves long and narrow; flowers larger, few	***H. foliosa***
4.	Side lobes of lip broad, midlobe narrower	5
4.	Side lobes of lip filiform or linear, midlobe as broad or broader	7
5.	Lip not or hardly longer than the lateral sepals	6
5.	Lip distinctly longer than the lateral sepals; spur about 12 cm long	***H. longicorniculata***
6.	Spur not longer than the ovary	***H. cephalotus***
6.	Spur much longer than the ovary	***H. longicornu***
7.	Leaves scattered along the stem	8
7.	Leaves clustered at middle of stem, radical	***H. brachyphylla***
8.	Floral bracts cucculate	***H. heyneana***
8.	Floral bracts not cucculate	***H. elliptica***

431. Habenaria brachyphylla (Lindl.) Aitch., J. Linn. Soc. Bot. 19: 188. 1882. *Platanthera brachyphylla* Lindl., Gen. Sp. Orchid. Pl. 293. 1835. *Habenaria crassifolia* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15. 72. 1841; Hook. f., Fl. Brit. India 6: 151. 1890; Gamble, Fl. Pres. Madras 1471 (1028). 1928; Fyson, Fl. South Indian Hill St. 2: t. 256. 1932; Abraham & Vatsala, Introd. Orchids 231. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 13.1989.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Terrestrial herbs. Stem 10-50 cm high. Leaves to 2.5 x 2.5 cm, broadly ovate, subacute or acute, adpressed to the ground. Flowers white, in about 17 cm long spike; bracts 6.5 x 2 mm, oblong-lanceolate, 2-veined; dorsal sepal 0.4 x 3 mm, broadly elliptic, obtuse, 5-veined; lateral sepals 5 x 3 mm, obliquely ovate, 3-veined; petals 3.5 x 2.1 mm, obliquely ovate-lanceolate, acute, 2-veined; lip 5 x 5 mm, 3-lobed; lobes unequal;

lateral lobes 3 x 0.5 mm, oblong, obliquely truncate, dentate at apex; midlobe 3.5 x 1.0 mm, oblong-lanceolate, obtuse; spur 13 x 0.5 mm, cylindric, obtuse.

Flowering & Fruiting: August - September.

Notes: Found in grasslands ± 2100 m, common in Glenmorgan.

432. Habenaria cephalotes Lindl., Gen. Sp. Orchid. Pl. 322.1835; Hook. f., Fl. Brit. India 6:139.1890; Gamble, Fl. Pres. Madras 1469 (1027). 1928; Fyson, Fl. South Indian Hill St. 2: t. 253. 1932; Abraham & Vatsala, Introd. Orchids 219. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 13.1989. *Habenaria trichosantha* Wall. ex Hook. f., Fl. Brit. India 6: 138. 1890.

Distribution: Endemic to South India. *Habitat*: Grasslands.

Terrestrial herbs. Stem 6-20 cm high. Leaves 4-5 x 0.8-0.9 cm, oblong-lanceolate, acute. Flowers white, in 4-6 cm long, terminal, few flowered raceme; dorsal sepal 8 x 9 mm, broadly ovate, obtuse, hooded, 5-veined; lateral sepals 9 x 10 mm, elliptic, obtuse, 5-veined; petals 6 x 2 mm, oblanceolate, acute, 1-veined; lip 11 x 9 mm, 3-lobed; lateral lobes, 9 x 4 mm, oblanceolate, dentate along distal margins; midlobe 5 x 1.5 mm, oblong, acute; spur 4 cm long, cylindric, obtuse.

Flowering & Fruiting: July - September.

Notes: Found in grasslands ± 2050 m, common in Mukurthi.

433. Habenaria digitata Lindl., Gen. Sp. Orchid. Pl. 307. 1835; Hook. f., Fl. Brit. India 6: 134. 1890; Gamble, Fl. Pres. Madras 1469 (1026). 1928; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 14.1989. *Habenaria trinervia* Wight, Ic. t.1701. 1852. *Habenaria travancorica* Hook. f., Fl. Brit. India 6: 135. 1890; Fyson, Fl. South Indian Hill St. 3: t. 518. 1920. *Habenaria digitata* Lindl. var. *travancorica* (Hook. f.) C.E.C. Fisch. in Gamble, Fl. Pres. Madras 1469(1026). 1928. **(PLATE 47: 407)**

Distribution: India to Myanmar. *Habitat*: Grasslands.

Terrestrial herbs, up to 30 (-50) cm, with stalked ovate tuberoids. Stem stout, leafy. Leaves 5-7, sessile, largest and crowded in about the middle of stem, orbicular to oblong-lanceolate, acute to acuminate, up to 10 x 4 cm, margin undulate. Inflorescence dense. Lower bracts foliaceous, the lower exceeding ovary, the upper equalling ovary. Flowers greenish-white. Sepals green, the dorsal sub-orbicular-

concave, 6 x 6 mm, lateral sepals obliquely ovate-lanceolate, 10 x 4 mm. Petals 2-parted nearly to the base, posterior lobe greenish, curved backwards and upwards, linear-lanceolate, sickle-shaped, anterior lobe whitish, filiform, curved backwards, 10-12 mm long, usually slightly longer than posterior. Labellum deeply 3-parted, white at base, lobes subequal, narrow-linear, mid-lobe straight, 12-14 mm long, green towards the apex, side-lobes spreading and curved backwards, slightly variable in length, somewhat shorter than mid-lobe. Spur ca 11 mm long, slightly shorter than ovary, inflated towards apex. Column 4-5 mm high; anther canals short, curved upwards; stigmatic processes clavate. Ovary glabrous.

Flowering & Fruiting: August - November.

Notes: Found in grasslands ± 2100 m, common in Pykara.

434. Habenaria elliptica Wight, Ic. 5:13, t.1706. 1851; Hook. f., Fl. Brit. India 6: 147. 1890; Fyson, Fl. South Indian Hill St. 3: t. 522. 1920; Gamble, Fl. Pres. Madras 1471 (1028). 1928; Abraham & Vatsala, Introd. Orchids 233. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 14.1989. **(PLATE 47: 408)**

Distribution: South India. *Habitat*: Grasslands.

Herbs; tubers ellipsoid, 2-2.5 x 0.6 cm: stem 8 to 24 inches, leafy. Leaves mostly near the ground but also on the stem above, lanceolate or elliptic, acute, 5-10 x 1-2 cm, the upper smaller and merging into the floral bracts, which are lanceolate acute, shorter than the ovary. Flowers white, 1.2 cm across, in many flowered dense racemes dense. Dorsal sepals and petals erect, arching over the column: lateral sepals spreading. Lip curved down, divided to near the middle into three nearly equal lobes: lateral lobes acute, entire or dentate on the outer margin; spur 2 cm long, slender above, below much thickened and curved forwards. Stigmatic processes fleshy, deflexed down against the labellum. Ovary 2 cm long, curved forwards.

Flowering & Fruiting: August - September.

Notes: Found in grasslands ± 2050 m, common in Pykara.

435. Habenaria foliosa A.Rich., Ann. Sci. Nat. Bot. 15: 71. 1841; Wight, Ic. t. 1700. 1851; Fyson, Fl. South Indian Hill St. 2: t. 252. 1932; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 14.1989. *Habenaria gibsonii* Hook.f., Fl. Brit. India 6: 135. 1890. *Habenaria digitata* Lindl. var. *foliosa* (A.

Rich.) Hook. f., Fl. Brit. India 6: 133. 1890; C.E.C. Fisch. in Gamble, Fl. Pres. Madras 1470 (1026). 1928. **(PLATE 47: 409)**

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Tuberous herbs. Leaves to 11 x 2.5 cm, equidistant, linear-lanceolate or oblanceolate, mucronate, glabrous. Scape to 10 cm long, flowers white, about 5, to 1.5 cm across. Dorsal sepal elliptic, concave 6 x 7 mm; laterals falcate, 1 x 0.5 cm. Petals 2-partite, lobes linear, upper 7 x 1 m, lower 5 x 1 mm. Lip deeply 3-lobed, lobes linear, minutely warty; midlobe 1.3 x 0.1 cm; side lobes 1 cm long; spur longer than ovary.

Flowering & Fruiting: August - September.

Notes: Found in grasslands ± 2050 m, common in Glenmorgan.

436. Habenaria heyneana Lindl., Gen. Sp. Orchid. Pl. 320. 1835; Hook. f., Fl. Brit. India 6: 148. 1890; Fyson, Fl. South Indian Hill St. 3: t. 523. 1920; Gamble, Fl. Pres. Madras 1471 (1028). 1928; Abraham & Vatsala, Introd. Orchids 231. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 14.1989. *Habenaria subpubens* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: t. 4C.1841; Hook. f., Fl. Brit. India 6: 148. 1890. *Habenaria glabra* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 75. 1841. *Habenaria candida* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 262. 1850. *Habenaria cerea* Blatt. & McCann, Journ. Bombay Nat. Hist. Soc. 36: 21. t. 6. 1932. *Habenaria cerea* Blatt. & McCann var. *polyantha* Blatt. & McCann, Journ. Bombay Nat. Hist. Soc. 36: 22. 1932. **(PLATE 47: 410)**

Distribution: Peninsular India. *Habitat*: Shola forests.

Terrestrial herbs. Stem 10-40 cm high. Leaves 4-6 x 0.5-0.9 mm, oblong-lanceolate, acute, cauline. Flowers white, on 3-5 cm long, secund spike; bracts 15 x 6 mm, ovate-lanceolate, acute, foliaceous; dorsal sepal 9 x 4 mm, elliptic-oblong, acute, 5-veined; lateral sepals 10 x 3.5 mm, elliptic-oblong, obtuse-apiculate, 5-veined; petals 8.5 x 4.5 mm, obliquely ovate-lanceolate, obtuse, 3-veined; lip 10 x 6 mm, 3-lobed; lobes subsimilar; lateral lobes, 7 x 1.5 mm, obliquely oblong-lanceolate, obtuse; midlobe 7.5 x 2.5 mm, oblong-lanceolate, obtuse; spur, 13 x 1 mm, cylindric, subacute to obtuse.

Flowering & Fruiting: August - October

Notes: Found in grasslands ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 15.08.1991, a 66 (Cairn Hills).

437. Habenaria longicorniculata Graham, Cat. Bombay Pl. 202. 1839; Abraham & Vatsala, Introd. Orchids 238. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 15.1989. *Habenaria longicalcarata* A.Rich., Ann. Sci. Nat. Bot. ser.2, 15: 71. t. 3B. 1841; Hook. f., Fl. Brit. India 6: 141. 1890; Gamble, Fl. Pres. Madras 1470 (1027). 1928; Fyson, Fl. South Indian Hill St. 2: t. 254. 1932. *Habenaria longicalcarata* var. *viridis* Blatt. & McCann, Journ. Bombay Nat. Hist. Soc. 36: 20. 1932. **(PLATE 47: 411)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Terrestrial herbs. Stem 20-60 cm high. Leaves clustered towards base of stem, to 15 x 2 cm, oblong-lanceolate or linear-lanceolate, acute. Scape to 40 cm long. Flowers white, 2.5 cm across; sepals 1 x 0.6 cm, obliquely ovate; dorsal sepal concave; petals 1 x 0.3 cm, spathulate, obtuse; lip 3-partite, side lobes 1 x 0.6 cm, oblong, subcuneate, oblique at apex, subentire, 1 x 0.6 cm; midlobe linear-oblong, little shorter than the side lobes, narrower; spur to 12 cm long, linear, subclavate, to 12 cm long.

Flowering & Fruiting: July - August.

Utility: Used in Ayurveda medicine.

Notes: Found in grasslands ± 2050 m, common in Parson's valley.

PSU & NKK, Kodanad, 24.08.1994, 132 (TNFDH).

438. Habenaria longicornu Lindl., Gen. Sp. Orchid. Pl. 322. 1835; Hook. f., Fl. Brit. India 6. 139. 1890; Fyson, Fl. South Indian Hill St. 3: t. 521. 1920; Gamble, Fl. Pres. Madras 1470 (1027). 1928; Abraham & Vatsala, Introd. Orchids 229. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 15.1989. *Habenaria montana* A. Rich., Ann. Sci. Nat. Bot. ser 2, 15: 73 t. 4A. 1841. **(PLATE 48: 412)**

Distribution: Peninsular India. *Habitat*: Shola forests.

Terrestrial herbs. Stem 10-40 cm high. Leaves to 12 x 2.5 cm, clustered towards the middle of the stem, linear-oblong, lanceolate, acute or acuminate. Scape to 25 cm tall. Flowers to 8, 2.5 cm across; bracts shorter than the 2.5 cm long ovary; sepals ovate, acute; petals linear-oblong, narrower; lip 3-partite; side lobes 1.2 x 0.5 cm, cuneate, apex obliquely truncate, fimbriate; midlobe linear, shorter; spur to 10 cm long, apex clavate.

Flowering & Fruiting: September - October.

Notes: Found in grasslands ± 1800 m, common in Thaishola.

PSU & NKK, Naduvattam, 02.08.1991, a 67 (Cairn Hills).

439. Habenaria rariflora A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 70. t. 2D. 1841; Hook. f., Fl. Brit. India 6: 136. 1890; Gamble, Fl. Pres. Madras 1469 (1027). 1928; Fyson, Fl. South Indian Hill St. 1: 401. 1932; Abraham & Vatsala, Introd. Orchids 216. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 16.1989.

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Herbs; stem 10-12 cm high. Leaves 2.5-3.5 x 0.4 cm, linear, acute. Flowers white, 1 or 2, in 5-10 cm long, terminal raceme; dorsal sepal 6 x 6 mm, broadly ovate, obtuse, 5-veined; lateral sepals 7.5 x 3 mm, obliquely elliptic-oblong, subacute, 5-veined; petals 6 x 3 mm, unequally biparted, larger lobe 6 x 3 mm, ovate, acute; smaller lobe 11 x 0.5 mm, linear acute; lip 15 x 3 mm, 3-lobed; lateral lobes 11 x 0.5 mm, linear, acute, midlobe, 6 x 1 mm, oblong, obtuse; spur 40 x 2 mm, cylindric, obtuse.

Flowering & Fruiting: July - September.

Utility: Used in Ayurveda medicine.

Notes: Found in grasslands ± 2100 m, common in Ankinda.

LIPARIS L.C. Rich.

440. Liparis viridiflora (Blume) Lindl., Gen. Sp. Orchid. Pl. 31. 1830; Abraham & Vatsala, Introd. Orchids 410. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 18.1989. *Malaxis viridiflora* Blume, Bijdr. 392. 1825. *Liparis longipes* Lindl., Gen. Sp. Orchid. Pl. 30. 1830; Hook. f., Fl. Brit. India 5: 703. 1890; Gamble, Fl. Pres. Madras 1411(987). 1928. **(PLATE 48: 413)**

Distribution: Indo-Malesia. *Habitat*: Grasslands.

Terrestrial herbs. Pseudobulb 8 x 2 cm, tapering towards apex. Leaves 2 per pseudobulb, 20-25 x 2 cm, linear, acuminate. Flowers creamy, in 20 mm long raceme; dorsal sepal oblong acute, 1-veined; lateral sepals obliquely oblong, obtuse, 1-veined; petals linear, acute, 1-veined; lip 2.5 x 2 mm, oblong, acute, obtuse.

Flowering & Fruiting: September - October.

Notes: Found in grasslands ± 1800 m, common in Naduvattam.

LUISIA Gaud.

441. Luisia birchea (A. Rich.) Blume, Mus. Bot. Ludg.-Bat. 1: 64. 1849; Abraham & Vatsala, Introd. Orchids 481. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 18.1989. *Birchea teretifolia* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 67. 1841. *Luisia tenuifolia* Hook.f., Fl. Brit. India 6: 24. 1890; Gamble, Fl. Pres. Madras 1438 (1006). 1928. *Cymbidium triste* Wight, Ic. t. 911. 1845. *Luisia pulniana* Vatsala, Intr. Orch. 486. 1981. **(PLATE 48: 414)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Epiphyte herbs, to 40 cm tall. Leaves 15-25 x 0.2 cm, linear, obtuse. Flowers brownish, axillary, solitary; dorsal sepal 9.5 x 4 mm, oblong-lanceolate, obtuse, keeled, 3-veined; lateral sepals oblong-lanceolate, obtuse, keeled, 3-veined; petals linear, subacute, obtuse, 3-veined; lip 16 x 7 mm, elliptic-oblong, apex 2-lobed, with 2 lateral smaller, fleshy ridges on the lip.

Flowering & Fruiting: July - September.

Utility: Used in Folk medicine.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 24.08.1994, 131 (TNFDH).

OBERONIA Lindl.

1. Small to medium-sized plants; leaves usullay less than 10 cm long **2**
1. Larger plants; leaves 10-35 cm long .... ***O. brunoniana***

2. Side-lobes of lip entire .... ***O. wightiana***
2. Side-lobes insignificant .... ***O. verticillata***

442. Oberonia brunoniana Wight, Ic. t. 1622. 1851; Hook. f., Fl. Brit. India 5: 681. 1888; Gamble, Fl. Pres. Madras 1406 (984). 1928; Abraham & Vatsala, Introd. Orchids 422. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 20.1989. **(PLATE 48: 415)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Epiphytic herbs. Leaves brownish, to 28 x 2.5 cm, oblong-ensiform, acute. Scape flattened, adnated to upper most leaf. Spike to 18 cm long, with a distinct reflexed sterile tip. Flowers brick red, 4 x 2.5 mm, pedicelled, in close verticils; bracts 2 x 1.8

mm, ovate, acute, denticulate; dorsal sepal oblong, obtuse; lateral sepals ovate, acute; petals lanceolate, acute; lip 2 x 2.5 mm, ovate in outline, 3-lobed; lateral lobes oblong, ear-like; midlobe 2-lobuled; lobules oblong, truncate, diverging, with broad sinus; disc ovate, saccate.

Flowering & Fruiting: December - January.

Notes: Epiphytic on shola trees ± 1600 m, common in Thaishola.

PSU & NKK, Porthimund, 26.01.1991, a 70 (Cairn Hills).

443. Oberonia verticillata Wight, Ic. t. 1626. 1851; Hook. f., Fl. Brit. India 5: 677. 1888; Gamble, Fl. Pres. Madras 1405 (983). 1928; Abraham & Vatsala, Introd. Orchids 419. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 21.1989. *Oberonia verticillata* Wight var. *longibracteata* Blatt. & McCann, Journ. Bombay Nat. Hist. Soc. 35: 255. 1931. *Oberonia spiralis* Blatt. & McCann, Journ. Bombay Nat. Hist. Soc. 35: 256. 1931, non Griff. 1851, nec. Lindl. 1852. **(PLATE 48: 416)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic herbs. Leaves to 15 x 1.2 cm, oblong-ensiform, acute. Scape terete. Spike to 27 cm long. Flowers orange-yellow, 4.5 x 2 mm, in verticils; dorsal sepal oblong-ovate, obtuse; lateral sepals obliquely ovate, acute; petals oblong or ovate, obtuse; lip 3-lobed; lateral lobes rounded, auricled; midlobe 2-lobuled; lobules orbicular or obovate, serrate, overlapping each other, sinus narrow; disc indistinct.

Flowering & Fruiting: September - December.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

KNS, Dodabetta, 08.02.1963, 45 (FRC).

444. Oberonia wightiana Lindl., Bot. Reg. 25. Misc. 9. 1839; Hook. f., Fl. Brit. India 5: 683. 1888; Gamble, Fl. Pres. Madras 1407 (984). 1928; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 21.1989. *Oberonia arnottiana* Wight, Ic. t. 1628. 1851; R. Ansari & Balakr., Orch. Monogr. 4: 24. 1990. *Oberonia wightiana* Lindl. var. *arnottiana* (Wight) R. Ansari et al., Journ. Econ. Tax. Bot. 3: 118. 1982. *Oberonia wightiana* Lindl. var. *nilgirensis* R. Ansari et al., Journ. Econ. Tax. Bot. 3: 118. 1982. **(PLATE 48: 417)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic herbs. Leaves to 15 x 1 cm, oblong-ensiform, acute. Scape terete. Spike to 15 cm long. Flowers 3.5 x 1.5 mm, orange yellow, scattered on the rachis; dorsal sepal oblong, obtuse, entire; lateral sepals ovate-oblong, subacute; petals linear, obtuse, entire; lip 2 mm across, 3-lobed; lateral lobes oblong, ligulate, wing like on spreading; midlobe 2-lobuled; lobules ligulate, toothed at apex, diverging; disc ovate, indistinct.

Flowering & Fruiting: August - November.

Notes: Epiphytic on shola trees ± 2050 m, common in Pykara.

KNS, Dodabetta, 08.02.1963, 45A (FRC).

PECTEILIS Rafin.

445. Pecteilis gigantea (J. E. Smith) Rafin., Fl. Tellur. 2: 38. 1837; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 22.1989. *Orchis gigantea* J. E. Smith, Exot. Bot. 2: 79,t.100. 1805. *Habenaria susannae* Hook. f., Fl. Brit. India 6: 137. 1890, non (L.) R. Br. ex Spreng. 1826; Fyson, Fl. South Indian Hill St. 3: t. 520. 1920. *Platanthera susannae* Wight, Ic. t. 920. 1845, non (L.) Lindl. 1835; Gamble, Fl. Pres. Madras 1475 (1031). 1928. *Platanthera gigantea* (J.E. Smith) J. Vejik, Orchdeea 27: 133. 1965. **(PLATE 48: 418)**

Common names: Kalluchedi (M).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Terrestrial tuberous herbs, to 90 cm tall. Leaves to 10 x 7 cm, ovate-lanceolate, acute, sessile, scattered. Flowers white, 9-10 x 8 cm, racemes terminal, 2-4-flowered; bracts 7.5 x 3 cm, ovate-acuminate, foliaceous; dorsal sepal 4 x 5 cm, rhomboid, 7-9-veined; lateral sepals 5 x 2.5 cm, oblique at base, oblong, subacute, obtuse, 7-9-veined; petals 3.5 x 2-4 mm, linear, falcate, obtuse; lip 15 x 7 cm, including 12-13 x 0.5 cm cylindrical spur, 3-lobed; lateral lobes laciniate; midlobe oblong-lanceolate, obtuse; spur long, cylindrical; column short, foot absent; pollinia 2, granular, with long caudicle.

Flowering & Fruiting: September - October.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2050 m, common in Ankinda.

PSU & NKK, Kodanad, 08.08.1994, 115 (TNFDH).

446. Peristylus richardianus Wight, Ic. t. 1697.1851; Gamble, Fl. Pres. Madras 1474 (1030). 1928; Abraham & Vatsala, Introd. Orchids 246. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 22.1989. *Peristylus robustior* Wight, Ic. t. 1699. 1851. *Habenaria bicornuata* Hook. f., Fl. Brit. India 6: 150. 1890. **(PLATE 48: 419)**

Distribution: India and Nepal. *Habitat*: Shola forests.

Herbs, 20-50 cm high. Leaves 5 x 1-1.5 cm, lanceolate, acuminate. Flowers creamy, in about 15 cm long dense spike; dorsal sepal oblong, obtuse, keeled, 1-veined; lateral sepals oblong, obtuse, keeled, 1-veined; petals elliptic-lanceolate, obtuse, 1-veined with 2 lateral veins from the middle; lip 6 x 18 mm, 3-lobed; lobes unequal; midlobe 3 x 1 mm, oblong, obtuse; lateral lobes 8 x 0.5 mm, linear, upcurved; spur clavate, acute at apex.

Flowering & Fruiting: August - September.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2100 m, common in Pykara.

ROBIQUETIA Gaud.

447. Robiquetia virescens (Gard. ex Lindl.) Jayaweera in Dassanayake & Fosberg, Rev. Fl. Ceylon 2: 255. 1981. **(PLATE 48: 420)**

Distribution: South india and Sri Lanka. *Habitat*: Shola forests.

Epiphytes herbs, with non-pseudobulbous stems. Leaves 2.7-7 x 0.8-1 cm, linear-oblong; petioles 0.9-1 cm long, sheathing the internodes above. Flowers green or white, 1.2 x 3.5 mm, in 2-2.5 cm long racemes; peduncle slender 2.2-2.5 cm long with 3-5 brown, sterile bracts; floral bracts 0.8 x 1.7 mm, triangular, acute, margin spiny. Dorsal sepal 3.9 x 2.1 mm, lanceolate-oblong, obtuse or truncate; lateral sepals 3.8 x 1.8 mm. Petals 3.8 x 1.7 mm, lanceolate- oblong, truncate, crenulate. Lip a saccate lanceolate, spur 9.8 mm long, base of the sac acute, broadening towards the middle and tapering to the mouth, column green or white, 2.1 mm high, 1.2 mm broad; rostellum straight, 2-toothed. Anther depressed, 0.9 x 1 mm, ellipsoid and purple in colour; pollinia 0.5 x 1.4 mm.

Flowering & Fruiting: August - October.

Notes: Epiphytic on shola trees ± 2100 m, common in Sispara.

SATYRIUM Sw.

448. Satyrium nepalense D. Don, Prodr. Fl. Nepal. 26: 1825; Fyson, Fl. South Indian Hill St. 3: t. 526. 1920; Gamble, Fl. Pres. Madras 1476 (1032). 1928; Abraham & Vatsala, Introd. Orchids 210. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 24.1989. *Satyrium neilgherrensis* Wight ex Fyson, Fl. Ind. Hill. This 1876. 1932. **(PLATE 49: 421)**

Distribution: Sri Lanka, India, Bhutan and Myanmar. *Habitat*: Shola forests.

Terrestrial herbs, to 30 cm tall, with oblong tuber. Leaves 2 or 3, 5.5-14 x 3-6 cm, ovate or elliptic-lanceolate, acute or subacuminate. Flowers pink or white, in 10-35 cm long, dense terminal raceme; dorsal sepal oblong-lanceolate, 3-veined; lateral sepals elliptic, obtuse, 5-veined; petals oblong, obtuse, 3-veined; lip, 21 x 6 mm, superior, concave, keeled, enclosing the column with two parallel spurs; column erect; foot 0; pollinia 2, with recurved caudicle.

Flowering & Fruiting: August - September.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2000 m, common in Shanthinallah.

PSU & NKK, Wenlockdowns, 02.08.1991, a 73 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 101 (TNFDH).

SEIDENFADENIELLA Garay

449. Seidenfadeniella filiformis (Rchb.f.) Christm. & Ormerod. in Matthew, Fl. Palni Hills S. India 3: 1258. 1999. *Saccolabium filiforme* Rchb.f., Walp. Ann. 6: 887. 1864; Fyson, Fl. South Indian Hill St. 2: t. 250 & 515. 1932. *Sarcanthus filiformis* Wight, Ic. t. 1684.1851, non Lindl. 1842. *Saccolabium filiforme* Lindl. ex Hook. f., Fl. Brit. India 6: 56. 1890 p.p; Gamble, Fl. Pres. Madras 1446 (1010). 1928. *Schoenorchis filiformis* (Wight) Schltr., Feddes Repert. 1: 986.1913; Abraham & Vatsala, Introd. Orchids 475. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 24.1989. *Schoenorchis juncifolia* Thw., Enum. Pl. Zeyl. 304. 1864, non Blume 1825. *Saccolabium chrysanthum* Alston in Trimen, Handb. Fl. Ceylon 6: 277. 1931. *Schoenorchis chrysantha* (Alston) Garay, Bot. Mus. Leafl. Harvard Univ. 23: 22. 1972. *Seidenfadeniella chrysantha* (Alston) Sathish in Sathish & Manilal, Cat. Indian Orch. 47. 1994. *Saccolabium filiforme* Lindl. ex Hook.f. var. *pulneyensis* Fyson, Fl. Pulney Nilgiri Hill tops 1: 396 & 2: 250. 1915. **(PLATE 49: 422)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Pendulous epiphytic shrubs, to 30 cm long, stem woody, terete, green. Leaves 10-11, terete, linear, acute. Flowers orange-yellow, in 5-6 cm long, erect, dense axillary racemes; bracts 1.5 x 1.2 mm, ovate-lanceolate, acuminate; dorsal sepal oblong, acute, serrulate, 3-veined; lateral sepals falcately oblanceolate, 1-veined; petals orbicular or broadly elliptic-oblong, rounded, 3-veined; lip 7 x 1.5-4 mm, 3-lobed, lateral lobes rounded, orbicular; midlobe ovate, acute, papillate, deflexed; spur 5.5 x 1-2 mm, inflated, laterally compressed, rounded at base, thickened on backwall; column short and broad; foot 0; pollinia 2, entire.

Flowering & Fruiting: May - September.

Notes: Epiphytic on shola trees ± 1650 m, common in Thaishola.

PSU & NKK, Glenmorgan, 26.01.1991, a 72 (Cairn Hills).

SEIDENFIA Szlach.

1. Lip with 3-6 mm long, teeth on each side of median line **2**
1. Lip much broader than long, lacinate teeth on each side of median line .... ***S. versicolor***

2. Stem stout, not pseudobulbous; leaves usually petioled .... ***S. rheedei***
2. Stem short, distinctly pseudobulbous; leaves sessile .... ***S. densiflora***

450. Seidenfia densiflora (A.Rich.) Szlach., Syst. Orch. 3: 122. 1995. *Liparis densiflora* A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 18. 1841. *Malaxis densiflora* (A.Rich.) O.Ktze., Rev. Gen. Pl. 2: 673. 1891; Abraham & Vatsala, Introd. Orchids 394. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 19.1989. *Microstylis versicolor* Wight, Ic. t. 901. 1844, non Lindl. 1830; Hook. f., Fl. Brit. India 5: 691. 1890. *Microstylis luteola* Wight, Ic. t. 1632. 1852. *Microstylis densiflora* (A.Rich.) C.E.C. Fisch. in Gamble, Fl. Pres. Madras 1408 (985). 1928. **(PLATE 49: 423)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Terrestrial herbs. Pseudo-bulbous herbs. Leaves 2-3, ovate-lanceate to elliptic, 4-15 x 1-3 cm, base sheathing, apex acute, plicate. Racemes 6-25 cm long; bracts lanceate. Flowers dense, reddish, small, not resupinate. Dorsal sepal lanceate, deflexed. Lateral sepals obliquely oblong, deflexed. Lateral petals linear-lanceate, margins curved, held like horns. Lip laciniate, rhomboid, pectinate, 1-3- lobed, mid-lobe shorter than laterals; anthers 2-celled, pollinia 4, in pairs.

Flowering & Fruiting: June - August.

Notes: Found in the grasslands ± 2100 m, common in Pykara.

PSU & NKK, Kodanad, 17.08.1994, 136 (TNFDH).

451. Seidenfia rheedei (Sw.) Szlach., Syst. Orch. 3: 122. 1995. *Malaxis rheedei* Sw., Kongl. Vetensk. Acad. Nya Handl. 21: 235. 1800; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 19.1989. *Microstylis rheedei* (Sw.) Lindl., Gen. Sp. Orchid. Pl. 21. 1830p.p.; Hook. f., Fl. Brit. India 5: 690. 1890; Fyson, Fl. South Indian Hill St. 3: t. 510. 1920. **(PLATE 49: 424)**

Common names: Jeevakam, Pachilaperumal (M).

Distribution: India to Thailand, China and Sri Lanka. *Habitat*: Shola forests.

Terrestrial herbs. Stem swollen towards base, to 15 cm long. Leaves broadly ovate or elliptic, to 12 x 6 cm, with purple shades. Scape to 18 cm long. Bracts subulate, deflexed. Flowers orange yellow, 0.5 cm across. Sepals and petals linear, 3 mm long. Lip reniform, margin pectinate.

Flowering & Fruiting: July - September.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2200 m, common in Mukurthi.

452. Seidenfia versicolor (Lindl.) Marg. & Szlach., Pol. Bot. Journ. 46: 56. 2001. *Microstylis versicolor* Lindl., Gen. Sp. Orchid. Pl. 21. 1830; Hook. f., Fl. Brit. India 6: 690. 1890; Gamble, Fl. Pres. Madras 1408 (985). 1928; Fyson, Fl. South Indian Hill St. 2: t. 242. 1932. *Malaxis versicolor* (Lindl.) Abeyw., Ceylon J. Sci. Biol. Sci. 2: 147. 1959; Abraham & Vatsala, Introd. Orchids 399. 1981. **(PLATE 49: 425)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Terrestrial, tufted herbs; stems 20-30 cm, erect, swollen at base. Leaves 3 or 5, ovate-elliptic, green-purple. Bracts deflexed. Flowers greenish-yellow to purple. Sepals oblong-lanceolate. Petals linear. Lip reniform, dentate.

Flowering & Fruiting: July - September.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2100 m, common in Pykara.

SIRHOOKERA O. Ktze.

453. Sirhookera latifolia (Wight) O. Ktze., Rev. Gen. Pl. 2: 681. 1891; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 24.1989. *Josephia latifolia* Wight, Ic. t. 1743. 1851; Hook. f., Fl. Brit. India 5: 823. 1890; Gamble, Fl. Pres. Madras 1428 (999). 1928. **(PLATE 49: 426)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Epiphytic herbs, with very short stem and vermiform roots. Leaves 9-10 x 2-2.5 cm, including a petiole of 1-1.5 cm long, oblong, acute. Flowers white, in 15-20 cm long branched racemes; branches slender; dorsal sepal obovate, obtuse, 3-veined; lateral sepals elliptic-oblong, obtuse, 3-veined; petals oblong, obtuse, 1-veined; lip 4 x 2 mm, 3-lobed; lateral lobes smaller, oblong, obtuse, incurved; midlobe ovate, obtuse or acute.

Flowering & Fruiting: August - September.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam.

SPIRANTHES Rich.

454. Spiranthes sinensis (Pers.) Ames, Orch. 2: 53. 1908; Gamble, Fl. Pres. Madras 1454 (1016). 1928; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 25.1989. *Neottia sinensis* Pers., Syn. 2: 511. 1807. *Neottia australis* R. Br., Prodr. 319. 1810. *Spiranthes australis* (R. Br.) Lindl., Bot. Reg. 10. 1824; Hook. f., Fl. Brit. India 6: 102. 1890; Fyson, Fl. South Indian Hill St. 2: t. 251. 1932. *Spiranthes lancea* (Thunb.) Backer et al., Blumea 6: 361.1951; Abraham & Vatsala, Introd. Orchids 206. 1981. **(PLATE 49: 427)**

Distribution: Indo-Malesia to Pacific Islands. *Habitat*: Marshy areas.

Terrestrial herbs, to 50 cm tall, with fleshy tuberous roots. Leaves 3-4, radical, 10-18 x 0.5-1 cm, oblanceolate-linear, acute. Flowers yellowish-white, in 20-30 cm long glandular, slender, spirally twisted spikes; bracts 6 x 1.6 mm, lanceolate, acuminate, 3-veined; dorsal sepal oblong-lanceolate, obtuse, 3-veined; lateral sepals subfalcate, linear-oblong, obtuse, 1-veined; petals oblong, obtuse, 1-veined; lip 4 x 2 mm, sides incurved, apex obcordate, papillate, base with 2 fleshy globose calli.

Flowering & Fruiting: April - May.

Notes: Found in grasslands ± 2100 m, common in Pykara.

KNS, Bangithapal, 12.05.1963, 623 (FRC).

TRICHOGLOTTIS Bl.

455. Trichoglottis tenera (Lindl.) Rchb. f., Gard. Chron. 699. 1872; Abraham & Vatsala, Introd. Orchids 460. 1981; J. Joseph & R. Ansari in A.N. Henry et al., Fl. Tamil Nadu 3: 25.1989. *Oeceoclades tenera* Lindl., Gen. Sp. Orchid. Pl. 236. 1833. *Cleisostoma tenerum* (Lindl.) Hook.f., Fl. Brit. India 6: 73. 1890; Gamble, Fl. Pres. Madras 1448 (1012). 1928; Fyson, Fl. South Indian Hill St. 3: t. 516. 1932. **(PLATE 49: 428)**

Distribution: South India to Sri Lanka. *Habitat*: Shola forests.

Epiphytic shrubs, to 60 cm high, stem terete, woody, scandent. Leaves 3 x 1-1.5 cm, elliptic-oblong, obtuse. Flowers yellow, in few-flowered, 15-20 cm long, stout raceme; dorsal sepal elliptic, obtuse, 5-veined; lateral sepals oblanceolate, falcate, obtuse, 3-veined; petals smaller than sepals, oblong, obtuse, 5-veined; lip adnate to the base of column, 7 x 7.5 mm, 3-lobed; lateral lobes oblong, lanceolate, obtuse; midlobe ovate, obtuse, 3-lobuled, rounded; spur 3 x 1 mm, cylindrical; column and foot very short; pollinia 2.

Flowering & Fruiting: April - May.

Notes: Epiphytic on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Glenmorgan, 30.03.1991, a 56 (Cairn Hills).

73. OXALIDACEAE

1.	Leaves pinnate	***Biophytum***
1.	Leaves trifoliate	***Oxalis***

BIOPHYTUM A. DC.

456. Biophytum intermedium Wight, Illustr. 1: 162. 1840; Hook. f., Fl. Brit. India 1: 438. 1874; Gamble, Fl. Pres. Madras 133 (95). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 295.1920; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 50.1983; Manna in Hajra et al., Fl. India 4: 232. 1997. **(PLATE 49: 429)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Perennial herbs, semiwoody at base, erect, 60-120 cm high; nodes hairy; hairs stiff, reflexed, arranged in a ring. Leaves 5-10 cm long; leaflets 15-25 pairs, lowest smallest, scarcely overlapping, oblong, somewhat falcate, truncate at base, very obliquely

apiculate, glabrous; midnerve curved at apex; lateral than the leaves, densely pubescent. Flowers 4-8 in an umbel, ca 12 mm across; pedicels thrice as long as sepals; bracts subulate. Capsules as long as sepals; seeds tuberculate.

Flowering & Fruiting: February - June.

Notes: Found in the open areas, shola floor ± 2050 m, common in Ankinda.

PSU & NKK, Kodanad, 28.08.1995, 305 (TNFDH).

OXALIS L.

1. Caulescent herbs rooting at nodes; flowers yellow .... ***O. corniculata***
1. Acaulescent herbs with bulbs; flowers purple or violet .... ***O. dehradunensis***

457. Oxalis corniculata L., Sp. Pl. 435. 1753; Hook. f., Fl. Brit. India 1: 436. 1874; Gamble, Fl. Pres. Madras 132 (94). 1915; Fyson, Fl. South Indian Hill St. 2: t. 41. 1932; Vajr. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 51.1983; Manna in Hajra et al., Fl. India 4: 242. 1997. *Oxalis corniculata* L. var. *hispida* Blatt., Journ. Bombay Nat. Hist. Soc. 34: 898. 1931. **(PLATE 50: 430)**

Common names: Creeping oxalis, Creeping wood-sorrel, Indian sorrel (E); Huli-huniche, Pullampuruchi (K); Kottampulichan, Poliyarala, Puliyarila, Pulivayila, Pulichappadi, Pulisanthala, Pulichan (M); Puliyaarai (T).

Distribution: Cosmopolitan. *Habitat*: Grasslands.

Prostrate herbs with creeping stem, rooting at lower nodes. Leaves digitately 3-foliolate; leaflets 0.5-1.5 x 0.6-2 cm, broadly obcordate, base cuneate, apex emarginate; petioles 1.5-3 cm long. Flowers yellow, solitary or in axillary umbels; peduncles 4-10 cm long; pedicels 0.5-1 cm long; bracts 2, 3-4 mm long, linear-lanceolate. Sepals 5, 2-3 mm long, ovate-lanceolate. Petals 5, 5-6 x 3-4 mm, ovate-lanceolate. Stamens 10, in two rows. Ovary 5-celled; ovules many; styles 5, distinct. Capsules 0.8-1.5 x 0.3-0.5 cm, linear, puberulous outside. Seeds many, minute, brown.

Flowering & Fruiting: March - December.

Utility: Used in Ayurveda, Folk, Siddha and Unani medicine. The leaves are sour to taste. The whole plant is used in the form of juice to treat diarrhoea, piles, loss of appetite, quadrant type of malarial fever. The leaves are good source of vitamin C; the plant possesses astringent and antiseptic properties. Fresh juice of the plant cures dyspepsia, piles, anaemia and tympanitis. The leaves and seeds are edible.

Notes: Found in grasslands and roadsides ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 06.03.1991, b 69 (Cairn Hills); PSU & NKK, Kodanad, 14.11.1994, 347 (TNFDH).

458. Oxalis dehradunensis Raiz., Suppl. Fl. Upp. Gang. Plain 37-38. 1976; Manna in Hajra et al., Fl. India 4: 246. 1997. *Oxalis intermedia* Rich., Ess. Fl. Cuba 315. 1845, non Steud. 1841. *Oxalis richardiana* Babu, Herb. Fl. Dehra Dun 104. 1977. *Oxalis latifolia* Calder, Rec. Bot. Surv. Ind. 6: 335. 1919, Fyson, Fl. South Indian Hill St. 2: t. 45. 1932; non HBK 1821. **(PLATE 50: 431)**

Distribution: Native of Mexico and West Indies; introduced and naturalised in other areas. *Habitat*: Along roadsides.

Stemless herbs, forming bulbous bases without rootstock; bulbs ovoid, acute to 5 x 2 cm, with numerous basal somewhat erect stolons bearing a few small scales ending in ovoid acute bulbils; petioles to 20 cm long above joint; leaflets subequal, obdeltoid, incised halfway, 1.5-7 x 2-8 cm, often with 2 orange calli in notch, punctate, glabrous, subglaucous beneath. Inflorescences umbelled, 5-12 flowered; peduncles to 25 cm long; bracts 2, ovate, ca 0.5 mm long; pedicels filiform to 2 cm long above basal joint. Sepals oblong-lanceolate, obtuse, indistinctly 3-5 nerved; apical calli 2, ca 1 mm long, orange. Petals narrowly obtriangled, obliquely truncate, pinkish or reddish purple with greenish base, crumpled soon after anthesis. Filaments including basal connate portion 2.5-3 or 4-5 mm long, puberulous. Ovary ca 1.5 mm long, less than 1 mm thick, sparsely ciliate on ribs; ovules 3-6 in 1 or 2 rows in each locule; style ca 1 mm long; stigma peltate. Fruit not seen.

Flowering & Fruiting: May - November.

Notes: Weed in cultivation ± 2050 m, common in Pykara.

74. PARNASSIACEAE

PARNASSIA L.

1. Scapes large, ca 30 cm long .... *P. wightiana*
1. Scapes small, ca 15 cm long .... *P. mysorensis*

459. Parnassia mysorensis Heyne ex Wight & Arn., Prodr. 35. 1834; Hook. f., Fl. Brit. India 2: 402. 1878; Gamble, Fl. Pres. Madras 448 (317). 1919; Fyson, Fl. South Indian Hill St. 2: t. 103. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 145.1983.

Distribution: Peninsular India and the Eastern Himalayas. *Habitat*: Marshy areas.

Small scapigerous herbs. Leaves radical, orbicular to reniform, base cordate, 0.75-1.5 cm diam; petioles 1-4.5 cm long. Flowers solitary on scape, 6-12 cm long. Scape with a leafy bract at middle. Calyx broadly campanulate, 0.3-0.35 cm long, lobes 5, broadly ovate. Petals 5, white, broadly ovate, 0.4-0.5 x 0.2-0.25 cm. Stamens 5; staminodes 5, alternating with stamens. Ovary 0.3-0.4 cm long, ovoid, 1-celled; ovules many; style short; stigma 3-4. Capsules ovoid, 0.4-0.5 x 0.2-0.25 cm, 3-4 valved. Seeds minute, many.

Flowering & Fruiting: September - December.

Notes: Found in the marshy region of sholas ± 2100 m, common in Mukurthi.

460. Parnassia wightiana Wall. ex Wight & Arn., Prodr. 35. 834; Hook. f., Fl. Brit. India 2: 402. 1878; Gamble, Fl. Pres. Madras 448 (317). 1919; Fyson, Fl. South Indian Hill St. 3: t. 329. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 145.1983. **(PLATE 50: 432)**

Distribution: South India and the Himalayas. *Habitat*: Marshy areas.

Small herbs. Leaves radical, broadly ovate-cordate, 2.5-3.5 cm across broad, deeply cordate, with five basal veins, the three inner curving forward to met at the apex; peioles 5-10 cm long. Flowering stems 12-20 cm or more long with a bract half-way up nearly as large as the leaves, and similar to them, clasping the stem. Sepals imbricate, lanceolate, 6 mm long. Petals 8-12 mm long, oblong obovate, fringed in the lower and narrower part with slender hair-like fimbriae, white or pale yellow. Staminodes as long as the stamens ending above in five oblong processes with globular glandular heads. Ovary 1-celled, ovules numerous; stigma pink, three-lobed. Capsule three-angled or rounded, obcordate; seeds all near its base, ellipsoid with wrinkled coat.

Flowering & Fruiting: August - October.

Notes: Found in the marshy region of sholas ± 2050 m, common in Pykara.

75. PASSIFLORACEAE

1. Leaves semi-orbicular, base rounded .... *Decaloba*
1. Leaves deeply palmately lobed .... *Passiflora*

461. Decaloba leschenaultii (DC.) M. Roem., Fam. Nat. Syn. Monogr. 2: 160. 1846. *Passiflora leschenaultii* DC., Prodr. 3: 326. 1828; Hook. f., Fl. Brit. India 2: 599. 1879; Gamble, Fl. Pres. Madras 524 (370). 1919; ; Fyson, Fl. South Indian Hill St. 2: t. 119. 1932; S. R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 170.1983. **(PLATE 50: 433)**

Common names: Akasavellari, Murumurukkankodi, Seemavellari (M).

Distribution: Peninsular India. *Habitat*: Shola forests.

Slender climbers. Leaves to 4 x 8 cm, flat above, sub-orbicular, 3-ribbed; petiole 2.5 cm long. Flowers solitary, axillary, 4 cm across; pedicels 3 cm long; calyx 1.5 cm long, deeply lobed to the base; petals 1.5 x 1 cm, ovate, obtuse, white; corona 3-seriate, linear, pinkish; gynandrophore 1 cm long; filaments 1 cm long. Berry 4.5 x 3 cm, oblong, reddish, smooth, 3-valved; seeds 4 x 3 mm, ovoid, prominently and regularly pitted.

Flowering & Fruiting: March - May.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Dodabetta.

PSU & NKK, Mukurthi, 30.01.1991, d 77 (Cairn Hills); PSU & NKK, Kodanad, 08.08.1994, 294 (TNFDH); MPPR, Ootacamund, 03.10.1992, 21020 (FRC).

PASSIFLORA L.

1. Hypanthium more than 5 cm long; petals rose; leaves hirsute; berry subglobose... ***P. mollissima***
1. Hypanthium less than 1 cm long; petals white; leaves glabrous; berry oblong-ovoid. .... ***P. subpeltata***

462. Passiflora mollissima (H.B.K.) L. H. Bailey, Rhodora 18: 156. 1916; S. R. Srinivas. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 170.1983. *Tacsonia mollissima* H.B.K., Nov. Gen. Sp. 2: 144. 1817; Fyson, Fl. South Indian Hill St. 3: t. 343. 1920. **(PLATE 50: 434)**

Common names: Banana poka (E).

Distribution: Native of South America. *Habitat*: Shola forests.

Extensive climbers; branchlets densely soft-tomentose, slightly angled. Leaves cordate-ovate in outline, to 14 x 18 cm, coriaceous, sharply serrate, soft pubescent above and

tomentose below, deeply 3-lobed; lobes ovate-lanceolate, to 8 x 5 cm; petiole to 2 cm, with 6-8 glands towards the upper half; stipules auriculate-acuminate, to 8 mm, caducous; tendrils axillary, to 15 cm. Flower solitary, axillary, to 9 cm wide, pendulous; pedicel to 5 cm; bracts foliaceous, ovate, 2.5 x 2 cm, basally united. Hypanthium to 8 x 1 cm, swollen below, pubescent. Sepals 5, oblong-lanceolate, 6 x 2 cm, pinkish. Petals 5, oblong-lanceolate, to 6 x 2 cm, rose, with just 1 row of purplish tubercles, 2 x 2 mm (corona) at the mouth of hypanthium. Staminal column 9.5 cm; filaments 5, free, to 2 cm. Ovary pubescent, on a gynophore 9.5 cm; styles 3, each 1.5 cm. Berry oblong-ovoid, to 9 x 3 cm, softly tomentose outside, from a stalk 10 cm long; seeds numerous, ovate, 6 x 5 mm.

Flowering & Fruiting: September - May.

Notes: Naturalised in shola forests ± 2100 m, common in Dodabetta.

PSU & NKK, Kodanad, 20.07.1994, 108 (TNFDH).

463. Passiflora subpeltata Ortega, Nov. Rar. Pl. Hort. Matrit. 6: 78. 1798. *Passiflora calcarata* Mast., Trans. Linn. Soc. London 27: 638. 1871; Gamble, Fl. Pres. Madras 524 (370). 1919; ; Fyson, Fl. South Indian Hill St. 2: t. 120. 1932; S. R. Srinivas. in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 169.1983. **(PLATE 50: 435)**

Common names: White Passionflower (E); Vishnu chakra hambu (K).

Distribution: Native of South America, widely naturalised in other tropical countries. *Habitat*: Along roadsides.

Glabrous climbers; branchlets terete. Leaves subrotund in outline, to 10 x 13 cm, 3-lobed, chartaceous, glabrous; lobes oblong, middle one to 6 x 4 cm, laterals 5 x 3 cm; petiole to 4 cm, with 2-4 glands; stipules ovate-lanceolate, straight, 3.5 x 2 cm, entire, basally oblique; tendrils axillary, to 20 cm. Flower solitary, axillary, 3.5 x 4.5 cm; pedicel to 3.5 cm; bracts 3, foliaceous, ovate-lanceolate, 1.6 x 1.2 cm. Sepals 5, oblong-ovate, 2 x 0.8 cm, with a subapical spur 1.5 cm. Petals 5, white, oblong-lanceolate, 2.5 x 0.5 cm. Corona of an outer group of slender filaments 1 cm, and an inner one of 0.2 cm. Stamens 5, attached to the gynophore; filaments 8 mm. Ovary elliptic, on a gynophore 1.2 cm; styles 3, each 1 cm; stigma 2-lobed. Berry subglobose, to 6 x 5 cm.

Flowering & Fruiting: February - May.

Notes: Naturalised in roadsides and open areas ± 2100 m, common in Pykara.

PSU & NKK, Kodanad, 11.03.1994, 323 & 31.08.1994, 146 (TNFDH); KNS, Longwood, 08.05.1963, 487 (FRC).

76. PHYTOLACACEAE

PHYTOLACCA L.

464. Phytolacca octandra L., Sp. Pl. (ed. 2) 631. 1762; Ghosh & Sikdar, Journ. Econ. Tax. Bot. 4: 159. 1983; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 196.1987. **(PLATE 50: 436)**

Common names: Kakkapazham (T).

Distribution: Native of Tropical America, widely spread in many Tropical countries.

Habitat: Along road sides.

Subshrubs. Leaves alternate, 8 x 3 cm, obovate to spathulate, acute at apex, narrowed to the base, lineolate. Flowers 5-7 mm across, in long, axillary, 15 cm long racemes, shortly pedicelled; perianth lobes 5, ovate, spreading; stamens 5, free, filaments erect, anthers versatile; ovary depressed-globose, 6-7-lobed, 6-7-celled; ovules solitary in each cell, styles 6-7, short, curved out. Fruit a capsule, 8 mm across, depressed-globose, fleshy; seeds 6-8, biconvex, black, glabrous, polished.

Flowering & Fruiting: June - August.

Notes: Naturalised in roadsides and open areas ± 2050 m, common in Pykara.

PSU & NKK, Kalhatty, 27.03.1991, L c 5 (Cairn Hills); PSU & NKK, Kodanad, 04.11.1994, 221 (TNFDH); KNS, West Briar shola, 11.05.1963, 522 (FRC).

77. PIPERACEAE

1. Herbs; leaves opposite or whorled; flowers bisexual .... ***Peperomia***
1. Climbing shrubs; flowers dioecious .... ***Piper***

PEPEROMIA Ruiz & Pavon

1. Leaves subsessile, generally whorled; spikes hairy, small .... ***P. tetraphylla***
1. Leaves petioled, alternate; spikes glabrous, large .... ***P. blanda***

465. Peperomia blanda (Jacq.) Kunth, Nov. Gen. Sp. 1: 67,t.13. 1815. *Piper blandum* Jacq., Collect. 3: 211. 1789, var. *floribunda* (Miq.) Huber in Dassan. & Fosb.,

Rev. Handb. Fl. Ceylon 6: 294. 1987. *Peperomia arabica* Decne. var. *floribunda* Miq., Syst. Piperac. 122. 1843. *Peperomia dindigulensis* Miq., Syst. Piperac. 122. 1843; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210 (847). 1925; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 202.1987. *Piper heyneana* Wight, Ic. t. 1922. 1853. **(PLATE 50: 437)**

Distribution: Peninsular India. *Habitat*: Shola forests.

Erect terrestrial herbs, to 30 cm high; stem pubescent. Leaves 2-4.5 x 1.5-3 cm, elliptic to obovate, acute at either ends, 5-ribed from base, pubescent; petiole 1.2 cm long. Spike slender, erect; peduncle 1-2 cm long; bracts orbicular, peltate with white margins. Flowers distant. Nutlets 0.5 x 0.5 mm, obovoid to orbicular, acute, scaly.

Flowering & Fruiting: July - December.

Notes: Found in moist and rocky slopes of humus rich region of sholas ± 1800 m, common in Thaishola.

466. Peperomia tetraphylla (G.Forst.) Hook. & Arn., Bot. Beech Voy. 97. 1841; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 203.1987. *Piper tetraphylla* G.Forst., Prod. 5. 1759. *Peperomia reflexa* (L. f.) Dietr., Sp. Pl. 1:180.1839, non HB.K. 1815; Hook. f., Fl. Brit. India 5: 99.1886; Gamble, Fl. Pres. Madras 1209 (847). 1925; Fyson, Fl. South Indian Hill St. 2: t. 230. 1932. **(PLATE 50: 438)**

Distribution: Pantropical. *Habitat*: Shola forests.

Epiphytic herbs; branches diffuse to procumbent; stem and leaves thinly pubescent. Leaves 7-10 x 5-7 mm, orbicular, obtuse. Spike 1.5 cm long, erect, stout; peduncle 0.8 cm long; bracts peltate, sessile, with white margins. Flowers densely arranged; stamens 2; stigmas 3-toothed. Nutlets 0.8 x 0.4 mm, ovoid, beaked, brown, glabrous.

Flowering & Fruiting: February - March.

Utility: Used in Folk medicine.

Notes: Epiphytic on shola trees or in rocky slopes ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 29.09.1991, II d 56 (Cairn Hills); PSU & NKK, Kodanad, 22.06.1994, 73 & 05.07.1994, 208 (TNFDH); KNS, Staircase shola, 23.04.1964, 1264 (FRC).

1. Spikes globose, leas than 1.5 cm long; mature spike erect; bracts peltate .... *P. mullesua*
1. Spikes catkin-like, more than 4 cm long; mature spike pendulous; bracts not peltate, decurrent **2**

2. Flowers subtended by peltate orbicular bracts .... *P. schmidtii*
2. Flowers subtended by bracts adnate to the rachis .... *P. wightii*

467. Piper mullesua Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 20. 1825; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 202.1987. *Piper brachystachyum* Wall. ex Hook. f., Fl. Brit. India 5: 87. 1886; Gamble, Fl. Pres. Madras 1206 (844). 1925; Fyson, Fl. South Indian Hill St. 2: t. 228. 1932. **(PLATE 51: 439)**

Common names: Wild pepper (E); Kattukurumulagu, Kattuthippali (M).

Distribution: Peninsular and North East India. *Habitat*: Shola forests.

Slender climbers. Leaves to 9 x 4 cm, elliptic, acuminate at apex, acute at base, 3-5 ribbed from base, secondary nerves prominent, glabrous. Female spike to 7 x 4 mm, erect, oblong; peduncle 3 mm long; male spike to 4 cm long, erect, slender; bracts peltate, orbicular; stamens 3. Berry 1.5 mm across, red; stigmas 3, spreading.

Flowering & Fruiting: January - April.

Utility: Used in Ayurveda medicine.

Notes: Epiphytic on shola trees ± 1800 m, common in Naduvattam. The Red listed status of this species is Vulnerable for Tamil Nadu and Karnataka and Near Threatened in Kerala.

PSU & NKK, Glenmorgan, 26.02.1991, II d 58 (Cairn Hills); PSU & NKK, Kodanad, 05.07.1994, 308 & 20.10.1994, 210 (TNFDH); KNS, Longwood, 08.05.1963, 471 (FRC).

468. Piper schmidtii Hook.f., Fl. Brit. India 5: 89. 1886; Gamble, Fl. Pres. Madras 1206 (844). 1925; Fyson, Fl. South Indian Hill St. 2: t. 229. 1932; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 204.1987. *Piper arborescens* Miq., Syst. Piperac. 320. 1844 p.p. **(PLATE 51: 440)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Climbing shrubs; stem to 1.5 cm thick. Leaves alternate, each opposed by a spike or the spike scar, ovate-elliptic, often lop-sided, upper side dark green and glossy; lower

very pale to white; coriaceous; main veins usually 5 with prominent reticulation between: stalk 1-2 cm, curved. Male spikes 1 to 3, 2.5- 7 cm, stalk 1-2 cm long, pendent: bracts circular with free margin. Stamens usually two, with thick filaments and anthers opening by vertical cross slits. Female spikes 5-7 cm; in fruit longer, curved more or less and even spirally twisted: bracts square or roundish with raised margin, free all round. Berries red or yellow.

Flowering & Fruiting: November - April.

Notes: Epiphytic on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 27.01.1991, d 59 (Cairn Hills); PSU & NKK, Kodanad, 05.07.1994, 284 & 28.09.1995, 331 (TNFDH).

469. Piper wightii Miq. in Hook.'s London J. Bot. 5: 552. 1846; Hook. f., Fl. Brit. India 5: 94. 1886; Gamble, Fl. Pres. Madras 1207 (845). 1925; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 205.1987. **(PLATE 51: 441)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Stout glabrous climbers. Leaves 14-17 x 6-8 cm, ovate, acuminate at apex, round to subcordate at base, 3-5-ribbed, coriaceous, midrib with 2-3 lateral nerves similar to ribs, nervules reticulate; petiole 2 cm long. Spike 8 cm long stout, drooping; peduncle 2 cm long; bracts curved and hooded at one side. Flowers distantly arranged; stamens 2. Berry reddish, to 7 mm across, globose, smooth; stigmatic lobes 3 or 4.

Flowering & Fruiting: July - February.

Notes: Epiphytic on shola trees ± 2100 m, common in Ankinda.

78. PITTOSPORACEAE

PITTOSPORUM Banks ex Gaertn.

1. Racemes more than 20 flowered .... *P. tetraspermum*
1. Racemes less than 8 flowered 2

2. Branchlets, peduncle and pedicels glabrous .... *P. neelgherrense*
2. Branchlets, peduncle and pedicels tomentose .... *P. dasycaulon*

470. Pittosporum dasycaulon Miq., Anal. Bot. Ind. 3: 5. 1852; Hook. f., Fl. Brit. India 1: 199. 1872; Gamble, Fl. Pres. Madras 55 (40). 1915; R. Chandras. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 19. 1983; M.P. Nayar & G.S. Giri in B.D. Sharma & N.P. Balakr., Fl. India 2: 442. 1993. **(PLATE 51: 442)**

Common names: Boogri (K); Kasumaram (M).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Small trees; young branches densely tomentose. Leaves cuneate at base, entire at margin, acute at apex; petioles 8-18 mm long, puberulous. Inflorescences terminal or pseudoterminal umbelled or racemose, densely brownish tomentose. Sepals 2-3 x ca 1 mm, tomentose. Petals oblong, 10-12 x 2-2.5 mm, yellow. Filaments 6-7 mm long; anthers ca 2 mm long. Ovary ca 3 mm long, tomentose; style 4-5 mm long, glabrous. Capsules globose, 8-10 mm, woody; seeds 4-6, blackish pink.

Flowering & Fruiting: September - February.

Utility: Used in Folk medicine. Extract of stem bark shows antibacterial and antifungal activity.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Thaishola.

PSU & NKK, Kalhatty, 27.03.1991, L a 27 (Cairn Hills).

471. Pittosporum neelgherrense Wight & Arn., Prodr. 154. 1834; Hook. f., Fl. Brit. India 1: 198. 1872; Gamble, Fl. Pres. Madras 55 (40). 1915; R. Chandras. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 20. 1983; M.P. Nayar & G.S. Giri in B.D. Sharma & N.P. Balakr., Fl. India 2: 446. 1993. **(PLATE 51: 443)**

Common names: Kahi-mavu, Kuyimavu (K); Analivenga (M).

Distribution: India. *Habitat*: Shola forests.

Small trees to 8 m tall; bark brownish-black, lenticellate, with pungent aromatic smell. Leaves simple, alternate, estipulate; petiole 5-20 mm, slender, glabrous, grooved above; lamina 5-12 x 1.5-4 cm, narrowly elliptic, elliptic-obovate or elliptic-lanceolate, base attenuate or acute, apex acuminate, margin entire, glabrous, thinly coriaceous; lateral nerves 8-14 pairs, slender, faint, pinnate, midrib grooved above and slightly raised beneath, intercostae reticulate. Flowers bisexual, in slender simple racemes; pedicels 5 mm long, glabrous; sepals 5, 1.5 mm long, subulate, margin ciliate; petals yellow, 8 x 1.5 mm, oblong-lanceolate; ovary superior, densely tomentose with brown hairs, 1-celled; stigma 2-lobbed. Fruit a capsule, 2 valved, 1 cm across, yellow, woody, globular or slightly compressed; seeds 4-8, orange-red, smooth.

Flowering & Fruiting: January - June.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Naduvattam. Flora of Karnataka and Chikmagalur mentioned the presence of this species in Sri Lanka. Flora of India mentioned this species is present in Western Ghats of Karnataka, Kerala and Tamil Nadu.

PSU & NKK, Naduvattam, 04.03.1991, L a 25 (Cairn Hills).

472. Pittosporum tetraspermum Wight & Arn., Prodr. 154. 1834; Hook. f., Fl. Brit. India 1: 198. 1872; Gamble, Fl. Pres. Madras 55 (40). 1915; Fyson, Fl. South Indian Hill St. 2: t. 20. 1932; R. Chandras. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 20. 1983; M.P. Nayar & G.S. Giri in B.D. Sharma & N.P. Balakr., Fl. India 2: 447. 1993. **(PLATE 51: 444)**

Common names: Kuyimavu (K); Analivegam, Analivetham, Kachappatta (M); Sunari (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Large shrubs, to 2 m tall; bark rough, grey outside, pungent smelling when cut, granular. Leaves pseudoverticillate towards the branch tips, 6-9 x 2-4 cm, elliptic, acute at either ends, 10-12-nerved; midrib tomentose above and below; petiole 1 cm long. Flowers in terminal sessile umbels, pedicels 5 mm long; sepals 2.5 x 1.5 mm, ovate, obtuse, pubescent; petals creamy-white, 12 x 3 mm, oblanceolate, clawed; filaments 6 mm long; ovary densely hairy; style 4 mm long, glabrous. Capsule 8 x 8 mm, globose, smooth, black.

Flowering & Fruiting: February - April.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

PSU & NKK, Kalhatty, 27.03.1991, L a 26 (Cairn Hills); PSU & NKK, Kodanad, 14.11.1994, 55 (TNFDH); KNS, Staircase shola, 09.02.1963, 63 (FRC).

79. PLANTAGINACEAE

PLANTAGO L.

473. Plantago erosa Wall. in Roxb., Fl. Ind. 1: 423. 1820; G.R. Kumari in Henry et al., Fl. Tamil Nadu 2: 187.1987. *Plantago major* sensu Hook. f., Fl. Brit. India 4: 705. 1885 p.p., Fyson, Fl. South Indian Hill St. 2: t. 225. 1932, non L. 1753.

Plantago asiatica sensu Wight, Illustr. t. 177. 1850; Gamble, Fl. Pres. Madras 1160 (811). 1923, non L. 1753. **(PLATE 51: 445)**

Common names: Nilachakka, Njaramboori (M).

Distribution: Pantropical. *Habitat*: Roadsides.

Herbs, stem short or absent. Leaves radical, 7 x 5 cm, ovate, apex obtuse, base cuneate into a winged petiole, villous; petiole 5-6 cm long, sheathing at base. Flowers in elongated axillary dense spikes, bracts ovate, keeled; sepals 4, 2.5 mm long, ovate; corolla 2.5 mm long, salver-shaped, shortly lobed at apex, white; stamens 4, epipetalous, anthers versatile; ovary 1-celled; ovules 5-10; style 1, terminal, stigma linear. Capsule circumscissile, 6 x 3 mm; seeds many, oblong, black.

Flowering & Fruiting: April - June.

Utility: Used in Folk medicine.

Notes: Found in the open areas and wastelands ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 09.02.1991, d 21 (Cairn Hills); PSU & NKK, Kodanad, 28.09.1995, 331 & 518 (TNFDH).

80. POACEAE (GRAMINEAE)

1. Plants woody shrubs .... ***Oxytenanthera***
1. Plants herbaceous **2**

2. Mature spikelets falling entire from or with their pedicels or with the contiguous joint of the rachis, all alike or differing in sex and structure **3**
2. Mature spikelets breaking up, leaving the persistent or sub-presistent glumes on the rachis or pedicels, or if falling enteir then not consisting of 2 heteromorphous floets **11**

3. Spikelets usually in pairs, one sessile, the other, rarely both, pedicelled, rarely 3-nate or solitary on the axes of variously arranged often spiciform racemes; glumes firmer than the lemmas; lemmas membranous, often hyaline, the upper sometimes awned or reduced to an awn **4**

3. Spikelets in usually continuous spikes, racemes or panicle; glumes herbaceous or membranous, the lower generally smaller; sometimes minute or absent; lower lemma generally resembling the upper glume, the upper always fertile, ultimately rigid, chartaceous or crustaceous, muticous, mucronate or awned **8**

4. All spikelets alike in shape and sex or if dissimilar then paleas very short or absent .... ***Eulalia***
4. Sessile and pedicellate spikelets dissimilar **5**

5. Fertile spikelets 2-flowered .... *Ischaemum*
5. Fertile spikelets 1-flowered 6

6. Panicles not subtended by spathes .... *Chrysopogon*
6. Panicles subtended by spathes 7

7. Spikelets reduced to 1 or a few nodes with or without a surrounding involucre of modified male or empty spikelets .... *Themeda*
7. Spikelets many-noded, not reduced nor involucred .... *Cymbopogon*

8. Inflorescence usually different, various; fruiting lemma with more or less inrolled margins; lower palea not attached to the upper lemma .... *Oplismenus*
8. Inflorescence an open or a contracted, cylindric spiciform panicle, lower palea not attached to the upper lemma 9

9. Spikelets at least the upper of each branch, supported by bristle-like branches .... *Setaria*
9. Spikelets finely awned or mucronate from the sinus of the distinctly notched upper glumes and lower lemmas, the latter rarely muticous, delicately pediceled, panicled **10**

10. Upper florets only fertile .... *Pennisetum*
10. Both florets fertile .... *Isachne*

11. Awns of fertile floret if present kneed and twisted below the knee **12**
11. Awns of fertile floret if present never keeled **13**

12. Spikelets 2-several-flowered .... *Arundinella*
12. Spikelets 1-flowered .... *Agrostis*

13. Lemma typically 3-nerved .... *Eragrostis*
13. Lemma typically 5-many-nerved **14**

14. Glumes and lemmas muticous; spikelets laterally compressed **15**
14. Glumes and lemmas caudate, aristate or awned .... *Vulpia*

15. Spikelets ovate or triangular; pedicels capillary; glumes and lemmas broadly ovate, obtuse, not keeled .... *Briza*
15. Spikelets oblong; pedicels not capillary; glumes and lemmas Ovate-lanceolate, acute, keeled .... *Poa*

AGROSTIS L.

474. Agrostis peninsularis Hook.f., Fl. Brit. India 7: 255. 1896; Gamble, Fl. Pres. Madras 1810 (1253). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 87.1989. **(PLATE 51: 446)**

Distribution: India and Afghanistan. *Habitat*: Grasslands.

Herbs. Culms tufted, erect, to 60 cm; nodes glabrous. Leaf-blades 6-18 x 0.3-0.6 cm, smooth; ligule truncate, to 0.4 cm. Panicles to 20 cm, lax, open. Spikelets oblong-elliptic, to 0.3 cm; callus glabrous. Glumes ovate-oblong, 0.25-0.3 cm; lemma truncate, with 2 aristae and basally exerted awn; awn to 0.5 cm with a definite column; palea to 0.22 cm.

Flowering & Fruiting: November - January.

Notes: Found in grasslands ± 2100 m, common in Ooty town.

PSU & NKK, Wenlockdowns, 21.02.1991, b 35 (Cairn Hills).

ARUNDINELLA Raddi

475. Arundinella vaginata Bor, J. Indian Bot. Soc. 27: 66. 1948; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 93. 1989. *Arundinella villosa* sensu C.E.C. Fisch. in Gamble, Fl. Pres. Madras 1801 (1247). 1934, non Arn. ex Steud. 1854; Fyson, Fl. South Indian Hill St. 2: t. 284. 1932. *Arundinella villosa* Arn. ex Steud. var. *heynei* Hook.f., Fl. Brit. India 7: 73. 1896.

Common names: Chonappullu (M).

Distribution: South India. *Habitat*: Grasslands.

Herbs. Culms tufted, erect, to 70 cm, densely villous below panicle; nodes villous. Leaf-blades involute, 18-36 x 0.4-0.8 cm, abaxially densely tubercled-ciliate, adaxially sparsely tubercled-ciliate or glabrescent; ligule membranous, to 0.05 cm. Panicles to 15 cm, interrupted; axis villous; racemes to 3 cm, rachis villous. Spikelets to 0.7 cm, paired; pedicels unequal. Lower glume elliptic, to 0.65 cm, aristate, 3-5-veined; veins tubercled-ciliate; upper glume elliptic, to 0.7 cm, acute, 5-veined; veins tubercled-ciliate; lower lemma elliptic, to 0.6 cm, acute, 5-veined, scabrid on keel and at apex; palea lanceolate, to 0.45 cm; upper lemma elliptic-oblong, to 0.35 cm, acute, 2-lobed, 5-veined, scaberulous, awned; awn to 0.55 cm; palea to 0.35 cm.

Flowering & Fruiting: August - December.

Notes: Found in grasslands ± 1000 m, common in Kalhatty.

BRIZA L.

1. Spikelets more than 1 cm long, less than 12 per panicle .... ***B. maxima***
1. Spikelets less than 0.5 cm long, more than 30 per panicle .... ***B. minor***

476. Briza maxima L., Sp. Pl. 70. 1753; Hook.f., Fl. Brit. India 7: 336. 1896; Fl. South Indian Hill St. 2: t. 607. 1932; Gamble, Fl. Pres. Madras 3: 1837 (1280).1934; Bor, Grass. Burma Ceylon India Pakistan 527. 1960; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 97.1989. **(PLATE 51: 447)**

Distribution: Native of Mediterranean, wildly introduced and naturalized. *Habitat:* Open areas and wastelands.

Herbs, tufted annuals. Culms geniculate, 26-55 cm high; nodes brownish. Leaf blade linear-lanceolate, 11-15 x 0.5 cm, midrib prominent; leaf sheath keeled towards apex, 4-5.5 cm, tightly enclosing culm. Panicle 5-9 cm with 3-6 spikelets, pendulous when mature. Spikelets broadly ovate-lanceolate, 1-2 x 0.8-1.4 cm, greenish to golden yellow, margins more or less serrate. Lowe glume broadly ovate to elliptic, boat shaped, ca. 6 x 3 mm, 7-9 nerved. Florets 8-16, closely imbricate; rachilla zig-zag, enclosed by basal part of lemma. Stamens 3, anthers purplish; filaments 0.4-1.3 mm, hyaline. Ovary ovate-elliptic, 0.8-1 x 0.3-0.5 mm; stigma plumose, white. Caryopsis ovate-elliptic, brownish.

Flowering & Fruiting: July - March.

Notes: Found in cultivated fields and open areas ± 1900 m, common in Thalakuntha.

PSU & NKK, Kodanad, 230.03.1994, 32 (TNFDH); DDR, Ooty, 20.02.1902, 2092 (FRC).

477. Briza minor L., Sp. Pl. 70. 1753; Hook.f., Fl. Brit. India 7: 336. 1896; Fyson, Fl. South Indian Hill St. 2: t. 607. 1932; Gamble, Fl. Pres. Madras 3: 1837 (1280).1934; Bor, Grass. Burma Ceylon India Pakistan 527. 1960; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 97.1989. **(PLATE 52: 448)**

Common names: Small Quaking Grass (E).

Distribution: Native of Meditterranean, introduced and growing wild in the high ranges. *Habitat*: Wastelands and roadsides.

Annual herbs. Leaf blades 2-20 cm long, 2-10 mm wide; ligule 2.3-6.5 mm long at the apex, extending down to merge with the hyaline sheath margin. Panicle 4-10 cm long, 1-8 cm wide, ovoid, the branches widely spreading at maturity, scabrous, usually bearing more than 20 spikelets, or as few as 5 in depauperate specimens, the pedicels pendent. Spikelets 2.9-4 mm long, 3.5-4.1 mm wide, triangular-ovate, greenish; florets 5-9; glumes 3-5 nerved, herbaceous in the centre, hyaline at the margins, the lower glumes 1.6-2.4 mm long, the upper glumes 1.8-2.7 mm long; lower lemma 1.6-2.3

mm long, 5-9 nerved, the palea about 2/3 as long as the lemma; anthers 0.3-0.7 mm long, yellow or purple; stigmas white. Caryopsis 0.7-1 mm long, 0.5-0.7 mm wide, circular to obovate-elliptic in outline, flat to slightly concave on the hilum side, strongly convex on the embryo side, free from the palea, the hilum punctate, subbasal.

Flowering & Fruiting: September - December.

Notes: Found in cultivated fields and open areas ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 30.03.1994, 38 (TNFDH).

CHRYSOPOGON Trin.

478. Chrysopogon nodulibarbis (Steud.) Henrard, Blumea 4: 543. 1941. *Andropogon nodulibarbis* Steud., Syn. Pl. Glum. 1: 396. 1854. *Andropogon zeylanicus* Nees ex Steud., Syn. Pl. Glum. 1: 397. 1854; Hook. f., Fl. Brit. India 7: 192. 1896. *Chrysopogon zeylanicus* (Nees ex Steud.) Thw., Enum. Pl. Zeyl. 366. 1864; Fyson, Fl. South Indian Hill St. 3: t. 563. 1920; Gamble, Fl. Pres. Madras 1739 (1205). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 101.1989. **(PLATE 52: 449)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Perennial herbs; culms 80-150 cm high; nodes glabrous. Leaves usually collected at base, 20-30 x 0.4-1 cm, linear-lanceolate; sheath sharply keeled; ligule a fimbriate membrane. Panicle 10-20 cm long, lax with few spikelets. Sessile spikelets 6-8 mm long; lower glume 6 x 1.5 mm with two lines of bristles on dorsal side near the margins; upper glume similar but not with bristles; second lemma delicate, 1-nerved; awn 40 mm long; anthers 3 mm long. Pedicelled spikelets to 14 mm long; glumes unequal, awnless; upper floret male; lemmas awnless.

Flowering & Fruiting: December - February.

Notes: Found on barren rocky slopes and grasslands ± 1100 m, common in Kalhatty.

PSU & NKK, Kodanad, 14.08.1995, 500 (TNFDH); KNS, Avalanche, 26.04.1964, 1330 (FRC).

CYMBOPOGON Spreng.

479. Cymbopogon flexuosus (Nees ex Steud.) Wats. in Atkins., Gaz. N. W. Prov. Ind. 392. 1882; Gamble, Fl. Pres. Madras 1756 (1216). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 103.1989. *Andropogon flexuosus* Nees ex Steud.,

Syn. Pl. Glum. 1: 388. 1854. *Andropogon nardus* L. var. *flexuosus* (Nees ex Steud.) Hack. in A. & C. DC., Monogr. Phan. 6: 603. 1889; Hook. f., Fl. Brit. India 7: 207. 1896. **(PLATE 52: 450)**

Common names: Ginger Grass, East Indian lemon grass (E); Anthibalai (K); Chukkunaripullu, Malabar-grass, Inchipullu, Theruvappullu, Thailappullu, Vevvapullu (M).

Distribution: India and South East Asia. *Habitat*: Shola forests.

Perennial herbs. Culms 80-240 cm high, tufted; nodes glabrous. Leaves 20-80 x 1-2 cm, linear, rounded at base, flat; sheaths glabrous; ligule ovate, membranous. Inflorescence a large complex greyish panicle; branches slender, flexuous, often drooping. Racemes paired,with a spatheole beneath. Spikelets binate, one sessile, other pedicelled. Sessile spikelets 4-5 mm long, elliptic-lanceolate; lower glume 3 x 1 mm, elliptic-lanceolate, keels winged towards apex; upper glume ovate-lanceolate, margins ciliate; lower floret empty; upper floret bisexual; first lemma 2.5-3 x 1 mm, lanceolate, purplish, epaleate; second lemma 2 x 0.4 mm, deeply 2-fid, awned, hyaline, awn 6-10 mm; stamens 3, anthers 1-2 mm long; ovary 1 mm, oblong,stigmas 1-1.5 mm long; caryopsis 2 mm long, elliptic. Pedicelled spikelets 3-4 mm long, lanceolate; pedicels 2 mm long, densely villous; lower glume 3 x 1 mm, ovate-lanceolate; upper glume 3 x 1 mm, elliptic-lanceolate; lower floret male; upper floret wanting; first lemma 3 x 1 mm, elliptic-lanceolate; stamens 3, anthers 1.5-2 mm long.

Flowering & Fruiting: November - January.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 1600 m, common in Penstock.

PSU & NKK, Kodanad, 20.09.1995, 325 (TNFDH).

ERAGROSTIS Wolf.

1. Paleas falling at about the same time as the lemma or paleas deciduous .... ***E. unioloides***
1. Paleas persisting on the rachilla long after the lemma has fallen .... ***E. nigra***

480. Eragrostis nigra Nees ex Steud., Syn. Pl. Glum. 1: 267. 1854; Hook. f., Fl. Brit. India 7: 324. 1896; Fyson, Fl. South Indian Hill St. 3: t. 575. 1920; Gamble, Fl. Pres. Madras 1827 (1265). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 115.1989. **(PLATE 52: 451)**

Distribution: Sri Lanka, India to China. *Habitat*: Shola forests.

Tufted perennial herbs. Culms 30-50 cm high, erect; nodes glabrous. Leaves 15-25 x 0.2-0.6 cm, linear, base rounded with a tuft of long hairs; sheath slightly keeled, ciliate towards the mouth; ligule a fimbriate membrane. Panicle 15-30 cm long, lax, branches and pedicels smooth. Spikelets many, pedicelled, 5-6 x 2-3 mm, oblong, black; glumes similar, 2.2 x 0.5 mm, 1-nerved, keeled; florets 5-8, all bisexual; lemma 2.2 x 1 mm, ovate, acute, 3-nerved; palea 2 x 1 mm, oblong, curved, keels smooth.

Flowering & Fruiting: July - September.

Notes: Found along roadsides, wastelands and grasslands ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 10.10.1994, 254 & 20.11.1995, 360 (TNFDH).

481. Eragrostis unioloides (Retz.) Nees ex Steud., Syn. Pl. Glum. 1: 264. 1854; Hook. f., Fl. Brit. India 7: 317.1896; Gamble, Fl. Pres. Madras 1826 (1264). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 116.1989. *Poa unioloides* Retz., Obs. Bot. 5: 19. 1788. *Eragrostis amabilis* sensu Stapf in Hook.f., Fl. Brit. India 7: 317. 1896, non Wight & Arn. ex Nees 1838. **(PLATE 52: 452)**

Common names: Karayampullu (M).

Distribution: South East Asia, India and Africa. *Habitat*: Shola forests.

Annual herbs. Culms tufted, 10-55 cm high, erect or geniculate; nodes glabrous. Leaves 3-18 x 0.2-0.5 cm, linear-lanceolate or lanceolate, base rounded or shallowly cordate, apex acuminate; sheaths to 5 cm long; ligules membranous. Panicles 5-15 cm long, lax. Spikelets 4-6 x 2-4 mm, broadly ovate or ovate-oblong, 10-32-flowered, purplish. Lower glume 1-1.5 x 0.5 mm, lanceolate, 1-nerved. Upper glume 1-2 x 0.5-1 mm, ovate-lanceolate. Lemmas 1.5-2.5 x 1-1.5 mm, broadly ovate, 3-nerved. Paleas 1-2 x 1 mm, elliptic, 2-keeled. Stamens 3, violet. Stigmas white. Grains ca 1 mm long, ellipsoid, reddish-brown.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Found in open areas, roadsides and grasslands ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 05.07.1994, 332 & 14.11.1994, 534 (TNFDH).

EULALIA Kunth.

482. Eulalia phaeothrix (Hack.) O. Ktze., Rev. Gen. Pl. 2: 775. 1891; Gamble, Fl. Pres. Madras 1715 (1189). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 117.1989. *Pollinia phaeothrix* Hack. in A. & C. DC., Monogr. Phan. 6: 168. 1889; Hook. f., Fl. Brit. India 7: 112. 1896; Fyson, Fl. South Indian Hill St. 2: t. 285. 1932. **(PLATE 52: 453)**

Distribution: South India and Sri Lanka. *Habitat*: Grasslands.

Perennial herbs, culms to 100 cm high, tufted, nodes glabrous. Leaves 5-40 x 0.8 cm, linear-lanceolate, densely hairy above; ligule a tuft of white hairs. Racemes 3-15 cm long, yellowish-brown, densely hairy, sessile. Spikelets 5 mm long, awned, densely villous with golden brown hairs; florets 2, lower empty, upper bisexual; second lemma awned, awn to 15 mm long. Pedicelled spikelets to 4.5 mm long, awned or not.

Flowering & Fruiting: August - December.

Notes: Found in the ecotone region of grasslands ± 1000 m, common in Kalhatty.

PSU & NKK, Wenlockdowns, 27.01.1991, III c 58 (TNFDH); KNS, Bangithapal, 12.05.1963, 635 (FRC).

ISACHNE R.Br.

483. Isachne kunthiana (Wight & Arn. ex Steud.) Miq., Fl. Ind. Bat. 3: 460. 1857; Hook. f., Fl. Brit. India 7: 21. 1896; Fyson, Fl. South Indian Hill St. 3: t. 554. 1920; Gamble, Fl. Pres. Madras 1796 (1244). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 122.1989. *Panicum kunthianum* Wight & Arn. ex Steud., Syn. Pl. Glum. 1: 96. 1854. *Isachne kunthiana* (Wight & Arn. ex Steud.) Miq. var. *latifolia* Hook.f., Fl. Brit. India 7: 22. 1896; Gamble, Fl. Pres. Madras 1796 (1244). 1934. **(PLATE 52: 454)**

Distribution: South India, Sri Lanka and South East Asia. *Habitat*: Shola forests.

Geniculate perennial herbs; culms 20-40 cm high; nodes thickened, bearded. Leaves 2-5 x 0.5-2 cm, ovate, acute, densely covered with bulbous based hairs; margins coriaceous; sheath glabrous or hairy; ligule a tuft of hairs. Panicle 5-8 cm long; branches smooth. Spikelets 2.5 cm long, ovate, acute; glumes similar, 2.5 mm long, ovate, acute, 7-nerved; lemmas similar, 1.5 x 1 mm, ovate, obtuse, concave; palea 1.5 x 1 mm, oblong; stamens 3; anthers 1 mm long.

Flowering & Fruiting: September - October.

Notes: Seen in open, shady places and moist areas of sholas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, b 78 & 21.02.1991, b 77 (Cairn Hills); PSU & NKK, Kodanad, 22.06.1994, 79 & 05.07.1994, 439 (TNFDH).

ISCHAEMUM L.

484. Ischaemum indicum (Houtt.) Merr. ssp. **indicum** var. **villosum** (Nees) R. Kr. Singh & P.S.N. Rao, J. Econ. Tax. Bot. 32: 813. 2008. *Spodiopogon villosum* Nees in Hook. & Arn., Bot. Beech. Voy. 242. 1838. *Ischaemum ciliare* Retz. var. *villosum* Hack. in A. & C. DC., Monogr. Phan. 6: 227. 1889; Hook. f., Fl. Brit. India 7: 134. 1896. *Ischaemum indicum* (Houtt.) Merr. var. *indicum* subvar. *villosum* (Nees) Bor, Grass. Bur. Cey. Ind. Pak. 180. 1960; Hook. f., Fl. Brit. India 7: 138. 1896. **(PLATE 52: 455)**

Distribution: India, Sri Lanka and China. *Habitat*: Grasslands.

Perennial herbs. Culms 40-70 cm high; nodes bearded. Leaves 15 x 1 cm, lanceolate, acuminate, thickly pubescent; sheath keeled, glabrous; ligule membranous. Racemes 4-8 cm long; sessile. Spikelets 4-5 mm long; lower glume 2-winged at apex, glabrous; upper glume narrowly winged along the keel; first lemma oblong, 1-nerved; second lemma hyaline; awn 5-9 mm long. Pedicelled spikelets 4 x 2 mm, ovate-lanceolate, similar to lower spikelets.

Flowering & Fruiting: October - November.

Notes: Found in grasslands ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, b 80 & Masinagudi, 27.03.1991, L c 69 (Cairn Hills); PSU & NKK, Kodanad, 28.07.1995, 274 (TNFDH).

OPLISMENUS P. Beauv.

485. Oplismenus undulatifolius (Ard.) P.Beauv. ex Roem. & Schult., Syst. Veg. 2: 482. 1817; Hook. f., Fl. Brit. India 7: 66. 1896; Fyson, Fl. South Indian Hill St. 3: t. 558. 1920; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 129.1989. *Panicum undulatifolius* Ard., Ammadu. Bot. Spec. Alt. 14, t. 4. 1764. **(PLATE 52: 456)**

Distribution: Southern Europe, eastwards through the temperate parts of Asia. *Habitat*: Shola forests.

Annual herbs; culms 30-50 cm tall, creeping or trailing, lower nodes rooting. Leaves 5-15 x 0.5-0.8 cm, lanceolate, oblique at base, glabrous; sheath rounded; ligule membranous. Panicle 5-10 cm long; racemes short. Spikelets 4-6 mm long; lower glume 3 x 1 mm, 5-nerved; upper glume 2.5 mm long, 5-nerved, aristate or awned; first lemma 4 x 1.5 mm, aristate, epaleate; second lemma 3 x 1 mm, hyaline; palea similar, 2-nerved; ovary oblong; stigma plumose, pale yellow.

Flowering & Fruiting: February - April.

Notes: Seen in open, shady places and moist areas of sholas ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, III b 81 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1994, 324 (TNFDH).

OXYTENANTHERA Munro.

486. Oxytenanthera monadelpha (Thw.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) 342. 1931; Gamble, Fl. Pres. Madras 1861 (1288). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 130.1989. *Dendrocalamus monadelphus* Thw., Enum. Pl. Zeyl. 376. 1864. *Pseudoxytenanthera monadelpha* (Thw.) Sodestrom & Ellis, Smiths. Contrib. Bot. 72: 52. 1988. *Oxytenanthera thwaitesii* Munro, Trans. Linn. Soc. London 26: 129. 1868; Hook. f., Fl. Brit. India 7: 402. 1896. **(PLATE 53: 457)**

Common names: Kattumula (M); Oda (T).

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Bushy subshrubs. Culms, tufted. Leaves to 20 x 3 cm, ovate, lanceolate, long acute at apex, margins, minutely serrate. Panicles of spicate branches; spikelets in clusters, forming pseudo-panicles, to 1.5 cm long, with 1 fertile and 2 dormant florets, lower glume 5 mm, obovate-triangular, mucronate, ciliate along the margins and upper part; upper glume 9 mm, oblong-triangular, lemma 12 mm, ovate-elongate, mucronate; palea little smaller; stamens 6, filaments united.

Flowering & Fruiting: February - January.

Notes: Found in the shola border ± 2050 m, common in Pykara. The tender shoots obtained during early monsoon are cooked as curries by local people.

PENNISETUM Rich.

487. Pennisetum clandestinum Hochst. ex Chiov., Annuario Inst. Bot. Roma 8: 41. t. 5. f. 2. 1903; Gamble, Fl. Pres. Madras 1792 (1241). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 133.1989. **(PLATE 53: 458)**

Common names: Kikuyu grass (E); Dondauchi (T).

Distribution: Native of East Africa. *Habitat*: Cultivated fields and road sides.

Herbs. Culms densely tufted, matty, prostrate, and stoloniferous, to 3(15)cm. Leaf-blades involute or flat, 1.5-5(12) x 0.2-0.4(0.6) cm., glabrescent, scaberulous on margins; ligule a rim of dense cilia, to 0.15 cm. Plants dioecious. Racemes of 2-4-spikelets, enclosed almost completely by uppermost leaf-sheaths. Spikelets linear-lanceolate, to 1.5 cm; terminal spikelets pedicelled, others(sub)sessile; involucral bristles unequal, to 1.2 cm, scabrid. Lower glume minute, to 0.05 cm; upper glume ovate-acuminate, to 0.8 cm, membranous; lower lemma lanceolate, to 1.5 cm, membranous, epaleate. Upper lemma similar to lower lemma, to 1.3 cm; palea linear-lanceolate, to 1.2 cm. Style long-exserted, to 4 cm. Stamens 3; filaments to 3 cm.

Flowering & Fruiting: Not seen.

Notes: Naturalized in open areas and cultivated lands; a common grazing grass and important soil binder in habitations ± 2100 m, common in Pykara.

POA L.

488. Poa annua L., Sp. Pl. 68. 1753; Hook. f., Fl. Brit. India 7: 345. 1896; Fyson, Fl. South Indian Hill St. 2: t. 609. 1932; Gamble, Fl. Pres. Madras 1850 (1280). 1934; Bor, Grass. Burma Ceylon India Pakistan 555. 1960; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 134.1989. **(PLATE 53: 459)**

Common names: Annual Meadow Grass (E); Kolapullu (M).

Distribution: Cosmopolitan. *Habitat*: Grasslands.

Annual herbs; culms 15-20 cm high, tufted; nodes glabrous. Leaves 5-10 x 0.2-0.3 cm; rounded at base, glabrous; sheath keeled, glabrous; ligule membranous. Panicle 5-6 x 2 cm, contracted; branches filiform, glabrous. Spikelets similar, 5-6 mm long, ovate, glabrous; lower glume 2 x 0.5 mm, lanceolate, 1-nerved; upper glume 2.5 x 1

mm, ovate, acute, 3-nerved; florets 2-4, similar; upper florets exerted; lemmas 3 x 1 mm, ovate-lanceolate, 3-5-nerved, hairy along the nerves; palea 3 x 0.75 mm, lanceolate, 2-nerved; stamens 3; ovary oblong; style short or absent.

Flowering & Fruiting: July - September.

Notes: Found in open areas and grasslands ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 31.01.1991, b 86 (Cairn Hills); PSU & NKK, Kodanad, 10.07.1995, 251 (TNFDH).

SETARIA Beauv.

489. Setaria pumila (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 139.1989. *Panicum pumilum* Poir. in Lam., Encycl. Suppl. 4: 273. 1816. *Setaria pallida-fusca* (Schum.) Stapf & C.E.Hubb., Bull. Misc. Inform. Kew 1930: 259. 1930; Gamble, Fl. Pres. Madras 1789 (1239). 1934. *Setaria glauca* Hack., Bot. Soc. Brot. 3: 135. 1884, non P. Beauv. 1812; Fyson, Fl. South Indian Hill St. 3: t. 560. 1920. *Panicum pallida-fuscum* Schum., Beskr. Guin. Pl. 58. 1827. **(PLATE 53: 460)**

Common names: Yellow Fox-tail Grass, Yellow bristlegrass (E); Bilikorlekhullu (K); Kambilippullu (M); Koralaepullu (T).

Distribution: Paleotropics. *Habitat*: Shola forests.

Annual herbs. Culms 30-105 cm high, erect; nodes glabrous. Leaves 5-23 x 0.4-1 cm, linear or lanceolate, base rounded, apex acuminate, sparsely hairy; sheaths to 8 cm long, keeled; ligules membranous, ovate. Panicles 4-10 cm long, spiciform, cylindric, yellowish; bristles 3-7 mm long, scabrid. Spikelets 2-2.5 mm long, ovate or subglobose. Lower glume 1-1.5 mm long, ovate-acute. Upper glume 1-2 mm long, ovate or orbicular. Lower floret male or barren. Upper floret bisexual. First lemma 2-2.5 x 1-2 mm, ovate-elliptic. Palea 1.5-2 x 1-1.5 mm, elliptic, hyaline, 2-keeled. Stamens 3. Second lemma 2-2.5 mm long, ovate, beaked, rugose. Palea 1.5-2 x 1 mm, ovate-oblong, crustaceous, rugose, 2-keeled. Stamens 3. Ovary oblong. Grains ca 1.5 mm long, ellipsoid.

Flowering & Fruiting: July - October.

Notes: Found moist places in sholas and grasslands ± 2100 m, common in Mukurthi.

PSU & NKK, Wenlockdowns, 20.12.1990, b 89 (Cairn Hills).

THEMEDA Forssk.

490. Themeda triandra Forssk., Fl. Aeg.-Arab. 178. 1775; Gamble, Fl. Pres. Madras 1746 (1209). 1934; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 144.1989. *Anthistiria imberbis* Retz., Obs. Bot. 3: 11. 1783; Hook. f., Fl. Brit. India 7: 211. 1896. **(PLATE 53: 461)**

Common names: Chekkanampullu (M).

Distribution: Paleotropics. *Habitat*: Grasslands.

Perennial herbs. Culms 50-170 cm high, erect, tufted; nodes glabrous. Leaves 10-25 x 0.4-0.8 cm, lanceolate, base rounded, apex acute, glabrescent; sheaths to 8 cm long, keeled; ligules membranous, fimbriate. Panicles 20-45 cm long; racemes to 6 x 3 cm; spatheoles 3-8 cm long, tuberculate-pilose. Involucral spikelets 2 pairs, 7-11 mm long, elliptic-lanceolate; lower glume 7-10 mm long, elliptic, 2-keeled; upper glume 7-10 x 1-2 mm, lanceolate; lower floret empty; upper floret male; first lemma 7-10 x 1-2 mm, elliptic-lanceolate; second lemma c. 1 mm long, ovate-acute; stamens 3. Sessile spikelets solitary in a raceme, 7-10 mm long, oblong; glumes oblong-lanceolate, lower 6-10 x 1-2 mm, upper 6-8 mm long; lower floret empty; upper floret bisexual; lemmas 3-5 mm long, elliptic, awns 2-5 cm long; stamens 3. Pedicelled spikelets 2 in a raceme, 6-10 mm long, lanceolate; glumes and spikelets more or less similar to those of the involucral spikelets.

Flowering & Fruiting: October - January.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 25.11.1994, 446 & 08.07.1995, 278 (TNFDH); KNS, Parson's valley, 08.11.1966, 2610 (FRC).

VULPIA C. Gmelin.

491. Vulpia myuros (L.) Gmel., Fl. Bot. 1: 8. 1805; Gamble, Fl. Pres. Madras 3: 1852 (1281). 1934; Bor, Grass. Burma Ceylon India Pakistan 564. 1960. *Festuca myuros* L., Sp. Pl. 74. 1753; Hook.f., Fl. Brit. India 7: 356. 1896. *Vulpia megalura* (Nutt.) Rydb. in Bull. Torrey Bot. Club 36: 538. 1909; V.J. Nair in A.N. Henry et al., Fl. Tamil Nadu 3: 146.1989. **(PLATE 53: 462)**

Distribution: Native to Europe and Mediterranean, through Middle east to India and southern USSR; wildly introduced in temperate areas. *Habitat*: In barren land, along roadsides and as weed as of cultivation in high elevations.

Tufted annual herbs. Culms decumbent, up to 40 cm high. Leaf base flat to involute, 3-12 cm long, attenuate at apex, pubescent dorsally; ligule membranous, ca. 0.5 mm long, truncate at apex; leaf sheath smooth. Panicle oblong to linear, partly enclosed by subtending leaf sheath, nodding when mature. Spikelet solitary, pedicilled, oblong, up to 1.2 cm long; pedicels 1-3 mm long. Glumes unequal, lower ones less than 2.5 mm long, 1-nerved; upper glumes lanceolate 3-8 mm long, 1-3 nerved. Florets 37. Lemma lanceolate, 5-7 mm long, acuminate and awned at apex, 5-nerved, awns 5-20 mm long. Palea linear-lanceolate, 2-keeled. Stamens 1, anther 0.3-1 mm long, persistent. Caryopsis oblong, ca. 3.5 mm long.

Flowering & Fruiting: September - March.

Notes: Found in grasslands, open areas and wastelands ± 2000 m, common in Thalakuntha.

PSU & NKK, Kodanad, 14.11.1995, 235 (TNFDH).

81. POLYGALACEAE

POLYGALA L.

1. Shrubs .... ***P. arillata***
1. Herbs **2**

2. Flowers yellow .... ***P. rosmarinifolia***
2. Flower other than yellow **3**

3. Leaves spathulate; wing sepals symmetrically orbicular or triangular ovate .... ***P. javana***
3. Leaves lanceolate or obovate; wing sepals elliptic-oblong **4**

4. Leaves obovate; petals rose; branchlets hispid; style equal to ovary, apical horse-shoe; seeds hispid .... ***P. bolbothrix***

4. Leaves lanceolate; petals purple or violet; branchlets glabrous; styles longer than ovary, apical hood-like, angled; sees glabrous .... ***P. sibirica***

492. Polygala arillata Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 199. 1825; Hook. f., Fl. Brit. India 1: 200. 1872; Gamble, Fl. Pres. Madras 58 (41). 1915; Fyson, Fl. South Indian Hill St. 2: t. 21. 1932; M. Chandrabose in N.C. Nair & A.N.

Henry., Fl. Tamil Nadu 1: 20. 1983; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 457. 1993. **(PLATE 53: 463)**

Common names: Red eye or yellow milkwort (E).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Shrubs to 1.5 m high. Leaves to 17 x 5 cm, elliptic, acuminate at apex, acute at base; nerves to 15 pairs; petiole 1 cm long. Racemes to 10 cm long. Flowers yellow; pedicels 5 mm long; outer sepals 5 x 4 mm, ovate, obtuse; inner sepals 14 x 8 mm, oblong, emarginate; petals 14 mm long, crest dichotomous; wings decurrent at base. Capsule 8 x 14 mm long, compressed, glabrous, striate; seeds oblong 7 x 4 mm, biconvex; caruncle reddish.

Flowering & Fruiting: October - December.

Utility: Used in Folk medicine. Roots are used as purgative and for headache, also employed for fermenting *murva* beer.

Notes: Found in the second storeys of sholas ± 2050 m, common in Dodabetta.

PSU & NKK, Dodabetta, 11.02.1991, b 31 (Cairn Hills); PSU & NKK, Kodanad, 02.03.1994, 4 (TNFDH); KNS, Longwood, 08.05.1963, 491 (FRC).

493. Polygala bolbothrix Dunn in Gamble, Fl. Pres. Madras 58 (42). 1915; M. Chandrabose in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 20. 1983; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 462. 1993. *Polygala ciliata* sensu Wight & Arn., Prodr. 38. 1834, non L. 1753. *Polygala ramaswamiana* Mukerjee var. *palniensis* Mukerjee, Journ. Bombay Nat. Hist. Soc. 53: 56. 1955 & Bull. Bot. Soc. Bengal 12: 38. 1958. *Polygala ramaswamianus f. devicolamensis* Mukerjee, Journ. Bombay Nat. Hist. Soc. 53: 56. 1955. *Polygala bolbothrix* Dunn var. *devicolamensis* (Mukerjee) R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 463. 1993; R.N. Banerjee & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 294. 2005. **(PLATE 53: 464)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Diffuse herbs; whole plant with bulbous based hairs. Leaves to 15 x 8 mm, obovate, obtuse, petiole 1 mm long; racemes 2 cm long, 2-4-flowered; pedicels 4 mm long. Flowers yellow; outer sepals 2 x 1 mm, ovate, acute, densely hairy; inner sepals 3.5 x 2 mm, ovate, acuminate, dorsal petal 3 x 2 mm; crest 2 mm long, dichotomous.

Stamens 8; sheath cleft at apex. Capsule 3.5 x 3 mm, densely bulbous based hairy along the margins; seeds 3 x 1.5 mm oblong, black hairy; caruncle 1.5 long, with 2 long and one short.

Flowering & Fruiting: January - May.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Thaishola.

494. Polygala javana DC., Prodr. 1: 327. 1824; Hook. f., Fl. Brit. India 1: 201. 1872; Gamble, Fl. Pres. Madras 58 (42). 1915; M. Chandrabose in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 21. 1983; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 473. 1993. *Polygala javana* var. *angustifolia* Thw., Enum. Pl. Zeyl. 22. 1864; Karthik. et al., Journ. Bombay Nat. Hist. Soc. 80: 64. 1985. **(PLATE 53: 465)**

Common names: Kodassari (M); Selagachedi (T).

Distribution: Sri Lanka, South East Continental Asia and Malesia. *Habitat*: Shola border.

Erect ascending herb. Leaves alternate, subsessile, obovate, oblanceolate or elliptic-oblong-linear, cuneate or attenuate at base, obtuse or rounded-mucronate at apex, 1.5-4.5 x 0.5-2 cm, rusty-strigose on both surfaces; petioles 1-2 mm long, puberulous. Flowers 7-8 mm long, in axillary terminal or leaf opposed erect or pendulous 2-9 cm long 2-many flowered racemes; bracts 3, ovate. Sepals 5, unequal, puberulous, yellow; outer sepals broadly ovate or lanceolate to elliptic-oblong; wing sepals broadly ovate, 3-angled, cordate at base, yellowish turning pale green or reddish violet. Petals 3, adnate at base, yellow; lateral petals ovate or elliptic-oblong; keel petal 4-5 mm long, pale yellow or green with violet multifid filiform crest on back of apex. Stamens 8, pinkish, encircling style. Ovary stipitate; style curved, broad towards middle; stigma subterminal, funnel- shaped, violet. Capsules broadly oblong or suborbicular, notched at apex; seeds oblong.

Flowering & Fruiting: September - March.

Notes: Found in the ecotone region of shoals and grasslands ± 2050 m, common in Ankinda.

495. Polygala rosmarinifolia Wight & Arn., Prodr. 37. 1834; Hook. f., Fl. Brit. India 1: 204. 1872; Gamble, Fl. Pres. Madras 58 (42). 1915; Fyson, Fl. South

Indian Hill St. 2: t. 22. 1932; M. Chandrabose in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 21. 1983; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 480. 1993. **(PLATE 54: 466)**

Distribution: India and Sri Lanka. *Habitat*: Grasslands.

Erect herbs. Leaves 15-25 x 5 mm, linear-oblong, acute at both ends, scabrous. Racemes to 25 mm long, axillary, 3-5 flowered. Flowers yellow; pedicels 2 mm long; outer sepals 1.5 x 1 mm, ovate, obtuse, ciliate, inner sepals 5 x 2 mm, curved, ciliate; wing petals 2.5 x 2 mm, oblong, dorsal petal 2 x 3 mm, erect, stalked, forked. Capsule 4.5 x 3 mm, pubescent; seeds 3 x 1 mm, oblong, pubescent, black.

Flowering & Fruiting: June - September.

Notes: Found in the ecotone region of shoals and grasslands ± 2100 m, common in Sispara.

PSU & NKK, Kodanad, 14.07.1994, 98 (TNFDH).

496. Polygala sibirica L., Sp. Pl. 702. 1753; Hook. f., Fl. Brit. India 1: 205. 1872; Gamble, Fl. Pres. Madras 58 (42). 1915; Fyson, Fl. South Indian Hill St. 2: t. 23. 1932; M. Chandrabose in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 22. 1983; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2:481.1993. *Polygala sibirica* L. var. *heyneana* (Wall. ex Wight & Arn.) Bennett in Hook.f., Fl. Brit. India 1: 205. 1872. *Polygala heyneana* Wall. ex Wight & Arn., Prodr. 38. 1834. **(PLATE 54: 467)**

Distribution: Indo-Malesia, China and Europe. *Habitat*: Shola forests.

Diffuse herbs. Leaves 11-15 x 5-7 mm, oblong, acute at both ends, glabrous. Racemes 5-10 mm long, axillary. Flowers densely packed, blue; outer sepals broadly ovate, unequal; inner sepals 3 x 1.5 mm, elliptic, acuminate, glabrous; wing petals 3 mm long, obovate, dorsal petal 4 mm long; crest fimbriate, branched. Capsule 2 x 2 mm, orbicular, glabrous, seeds 1.5 x 1 mm, hairy, caruncle-lobes equal.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of shoals and grasslands ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 26.01.1991, b 33 (Cairn Hills); KNS, Glemmorghan, 11.05.1963, 536 (FRC).

82. POLYGONACEAE

1. Perianth lobes 6 or more, inner ones erect and winged in fruit, outer ones reflexed .... *Rumex*
1. Perianth lobes 4-5 2

2. Nutlets exceeding perianth; racemes usually umbellate .... *Fagopyrum*
2. Nutlets not exceeding perianth; racemes capitate or spiciform racemes .... *Persicaria*

FAGOPYRUM Miller

497. Fagopyrum esculentum Moench., Meth. Pl. 290. 1794; Hook.f., Fl. Brit. India 5: 55. 1886; Gamble, Fl. Pres. Madras 2:1192 (835).1915; Fyson, Fl. South Indian Hill St. 2: t. 226. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 197.1987. **(PLATE 54: 468)**

Common names: Buckwheat (E).

Distribution: Central Asia. *Habitat*: Open areas.

Erect annual stout herbs, 35-50 cm high; branchlets reddish, glabrescent, hollow. Leaves alternate, triangular-ovate to sagittate, 2.5-5 x 2-4 cm, cordate at base, acute at apex, entire, petiole stout, to 4.5 cm. Inflorescence of terminal and axillary umbels or racemes; peduncle to 2.5 cm. Flowers bisexual dense; pedices 6 mm. Tepals 5, oblong, pinkish, 4 x3 mm, persistent. Stamens 8, alternating with yellowish, nectar-secreting glands. Ovary superior, 1 celled; ovule 1, basal; styles 3; stigma capitates. Nutlets 8 x 5 mm, tri-gonous, black, with edges winged and surrounded by acresecent perianth.

Flowering & Fruiting: May-September.

Utility: Used in Homeopathy, Modern medicine.

Notes: Found in roadsides and cultivated lands ± 2050 m, common in Ooty town.

PSU & NKK, Kodanad, 02.03.1994, 05 (TNFDH).

PERSICARIA (L.) P. Miller

1. Inflorescence capitate 1
1. Inflorescence racemose 2

2. Heads subtended by an involucral leaf .... *P. nepalensis*
2. Heads without subtending involucral leaf 3

3. Straggling shrubs .... *P. chinensis*
3. Herbs 4

4. Nutlets biconvex; leaves lanceolate, acuminate, silky pubescent .... *P. pulchra*
4. Nutlets trigonus; leaves oblong-lanceolate, acuminate, cordate or hastate at base, prominently prickly on the midrib beneath .... *P. strigosa*

498. Persicaria chinensis (L.) Gross. in Engl., Bot. Jahrb. Syst. 49: 269, 277, 315. 1913. *Polygonum chinense* L., Sp. Pl. 363. 1753; Hook. f., Fl. Brit. India 5: 44. 1886; Gamble, Fl. Pres. Madras 1190 (833). 1925; Fyson, Fl. South Indian Hill St. 3: t. 474. 1920; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 197.1987. **(PLATE 54: 469)**

Common names: Chinese Knotweed (E); Bili chinee kanigalu (K); Mudanthi, Mukkala, Oduthan, Poovallikodi, Thiruthanni, Thondi (M).

Distribution: Indo-Malesia and China. *Habitat*: Shola border.

Scandent subshrubs, branches zig-zag. Leaves to 10 x 5 cm, broadly ovate or elliptic, shortly acuminate at apex, truncate at base, margins minutely crenulate; petiole to 1 cm, auricled at base; ochrea 2.5 cm long, membranous, truncate. Heads glandular pubescent; peduncles to 5 cm; bracts 3 mm, ovate, acute; perianth lobes 4 mm; stamens included; ovary 3-gonous, styles 3. Nutlets 4 mm, trigonous.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine. Whole plant is used as a tonic, anti-scorbutic and vulnerary.

Notes: Found in shola borders ± 2100 m, common in Pykara.

PSU & NKK, Kodanad, 05.07.1995, 157 & 28.09.1994, 332 (TNFDH); KNS, Kokuthurai, 12.05.1963, 573 (FRC).

499. Persicaria nepalensis (Meisner) Gross in Engl., Bot. Jahrb. Syst. 49: 277. 1913. *Polygonum nepalense* Meisner, Monogr. Polygon. 84. t.7. 1826; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 198.1987. *Polygonum alatum* Buch.-Ham. ex Spreng., Syst. Cur. Post. 4:154. 1827; Hook. f., Fl. Brit. India 5: 41. 1886; Fyson, Fl. South Indian Hill St. 3: t. 473. 1920. *Polygonum punctatum* Buch.-

Ham. ex D.Don, Prodr. Fl. Nepal. 72. 1825, non Rafin. 1820; Gamble, Fl. Pres. Madras 1190 (833). 1925. **(PLATE 54: 470)**

Common names: Nepal Persicaria (E); Cherumukkala (M).

Distribution: West Asia to Indo-Malesia. *Habitat*: Cultivated fields.

Diffuse herbs, rooting from lowers nodes. Leaves deltoid, acute at apex, cuneate at base, sparsely hairy along the nerves below, glandulose; petiole 5-10 mm long; ochrea truncate at mouth, glabrous. Spike on the axils of terminal leaf, sessile, conical; bracts elliptic, acute, glabrous. Flowers solitary or paired; tepals white, 2 mm long, oblong, obtuse, glabrous; stamens 5; styles 2, joined below. Nut 1.5 x 1.5 mm, biconvex, apiculate, minutely puberulus, brown.

Flowering & Fruiting: October - December.

Utility: Used in Folk medicine.

Notes: Found in marshy and damp places ± 2050 m, common in Pykara.

500. Persicaria pulchra (Blume) Sojak, Preslia 46: 154. 1974. *Polygonum pulchrum* Blume, Bijdr. 530. 1826; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 199.1987. *Polygonum tomentosum* Willd., Sp. Pl. 2: 447. 1799, non Schrank 1789; Hook. f., Fl. Brit. India 5: 30. 1886; Gamble, Fl. Pres. Madras 1189 (832). 1925. **(PLATE 54: 471)**

Distribution: Africa and Indo-Malesia. *Habitat*: Shola border.

Stout herbs; stems thick and very hairy. Leaves 6-17 x 2.4-4 cm, elliptic-oblong or lanceolate, base attenuate, apex acuminate, densely strigose tomentose on both sides; petiole 1-2 cm long; ocrea 1.2-2.5 cm long, long-tubular, truncate, strigose, bristle ciliate. Flowers white in panicled racemes, 3.5-7.5 cm long. Bracts hispid and ciliate. Stamens 7-8. Styles 2. Nut c. 3 mm long, biconvex, shining, black.

Flowering & Fruiting: October - January.

Utility: Used in Folk medicine. Rootstock contains an acrid resin that acts as a cardiac depressant.

Notes: Found along the roadsides ± 1800 m, common in Naduvattam.

501. Persicaria strigosa (R. Br.) Nakai, Rigakkai 24: 299. 1926. *Polygonum strigonum* R. Br., Prodr. 420.1810; Hook. f., Fl. Brit. India 4:47.1886; Gamble, Fl. Pres.

Madras 1191(833). 1925; Fyson, Fl. South Indian Hill St. 3: t. 475. 1920; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 199.1987. **(PLATE 54: 472)**

Distribution: South Asia and China. *Habitat*: Marshy areas.

Creeping or suberect herbs; stems angular, the angles beset with small reflexed or recurved barbs or prickles, more so below the nodes. Leaves 3.5-12 x 2-3.5 cm, oblong or linear-oblong, base truncate to hastate, apex acuminate; petiole to 1.4 cm long; ocrea 2-2.5 cm long, long-tubular, truncate, with many excurrent nerves, terminating in erect setae. Flowers 3-4.5 mm across, white, in 6-12 mm long, oblong or subglobose peduncled heads; peduncles 5-15 cm long, panicled, slender, glandular-hispid below the head. Bracts ovate or oblong, strigose and ciliate. Perianth 3-5 mm long, campanulate; tube c. 2 mm long; lobes 5, 2-3 mm long, obovate, obtuse. Stamens 5, alternating with 5, yellow, subulate staminoids; filaments c. 2 mm long; anthers white. Ovary c. 1 mm long, ovoid; style c. 2 mm long, 2-fid; stigma capitate. Nut 1.5-2 mm across, biconvex, reddish-brown to black.

Flowering & Fruiting: November - May.

Utility: Used in Folk medicine.

Notes: Found in marshy and damp places ± 1800 m, common in Naduvattam.

RUMEX L.

502. Rumex nepalense Spreng., Syst. Veg. 2: 159. 1825; Hook. f., Fl. Brit. India 5: 60. 1886; Gamble, Fl. Pres. Madras 1192 (835). 1925; Fyson, Fl. South Indian Hill St. 2: t. 227. 1932; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 199.1987. **(PLATE 54: 473)**

Common names: Chethakkala (M).

Distribution: Paleotropics. *Habitat*: Cultivated fields.

Herbs, to 1 m tall; stem grooved. Leaves to 20 x 6 cm, elliptic-lanceolate, crenulate, punctuate; petiole 2-5 cm long. Flowers bisexual, in axillary fascicles, forming racemes above with whorled flowers; pedicelled, perianth lobes 6, biseriate, inner larger, 3 mm across, orbicular; stamens 6, free, filaments short; ovary 3-celled, 3-winged, ovules solitary in each cell; styles 3, spreading, stigma laciniate. Capsule 3-winged, 2.5 x 1.5 mm, glabrous.

Flowering & Fruiting: December - January.

Utility: Used in Folk medicine.

Notes: Found in disturbed and waste lands ± 2050 m, common in Ooty town.

PSU & NKK, Arambi, 08.02.1991, II b 53 (Cairn Hills); PSU & NKK, Pykara, 26.01.1991, 52 & Kodanad, 10.05.1994, 42, 24.08.1994, 304 (TNFDH).

83. PONTEDERIACEAE

EICHHORNIA Kunth

503. Eichhornia crassipes (Mart.) Solms. in A. & C. DC., Monogr. Phan. 4: 527.1883; Gamble, Fl. Pres. Madras 1530 (1069). 1928; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 42.1989. *Pontederia crassipes* Mart., Nov. Gen. Sp. 1: 9. t. 4. 1823. **(PLATE 54: 474)**

Common names: Water hyacinth (E); Kakapola, Kulavazha (M).

Distribution: South America; now naturalised in the Paleotropics. *Habitat*: Aquatic.

Herbs with short stem and many long fibrous roots, floating or sometimes rooting. Leaves glabrous, 45-110 x 50-100 mm; broadly ovate to rhomboid, entire, obtuse, base cuneate or rounded. Petiole glabrous and spongy, 6-30 cm long, with a fusiform bulbous portion about the middle. Peduncle spongy. Inflorescence (3-) 6-15 (-35) flowered. Flowers lilac, tinged blue, withering soon. Perianth c. 57 mm long, tube green, glandular; segments 34-40 mm long, obovate to ovate-oblong, posterior segment with a yellow spot. The longer 3 stamens c. 21 mm, filaments curved, glandular hairy; shorter filaments c. 6 mm long, glabrous; anthers purple-blue. Ovary ovoid, glabrous; style glandular; stigma 3-lobed, glandular.

Flowering & Fruiting: November - February.

Utility: Used in Ayurveda, Siddha medicine.

Notes: Aquatic weed in streams ± 2050 m, common in Pykara Dam.

PSU & NKK, Pykara, 10.05.1991, b 7 (Cairn Hills).

84. POTAMOGETONACEAE

POTAMOGETON L.

504. Potamogeton nodosus Poir., Encyc. Suppl. 4: 535. 1818; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 62.1989. *Potamogeton indicus* Roxb., Fl.

India 1: 471. 1820, non Roth ex Roem. & Schultes, 1818; Hook. f., Fl. Brit. India 6: 565. 1893; Gamble, Fl. Pres. Madras 1600 (1116). 1931. **(PLATE 55: 475)**

Distribution: Indo-Malesia, Europe, Africa and America. *Habitat*: Aquatic.

Perennial herbs, rhizomatous and aquatic. Stem branched, leafy, terete and simple. Leaves heterophyllous, submerged leaves petiolate, lanceolate or broadly lanceolate-oblong, veins 9 or more, thin translucent, 6-10.5 cm long; floating leaves broadly ovate, elliptic, coriaceous, of firm texture, 4-16 cm long, 2-5 cm broad, entire. Stipules free, keeled, lanceolate 2-15 cm long, 8-10 mm broad. Spikes cylindric, 4.5-11 cm long, 1.5-2.5 mm broad; peduncle 7-11 cm long. Flowers in whorls, sessile, small. Perianth segments small, obtuse, entire, c. 1.5 mm long. Stigma short. Fruitlets 3-4 mm long, 2-3 mm broad, obliquely obovoid, spongy, ventral margin convex, shortly beaked.

Flowering & Fruiting: Throughout the year.

Notes: Found in damp places ± 2050 m, common in Pykara dam.

85. PRIMULACEAE

LYSIMACHIA L.

505. Lysimachia procumbens Baudo, Ann. Sci. Nat. Bot. ser. 2, 5: 20. 1843; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 60.1987. *Lysimachia deltoidea* Wight, Illustr. 2: t.144. 1850; Hook. f., Fl. Brit. India 3: 505. 1882; Gamble, Fl. Pres. Madras 746 (525). 1921; Fyson, Fl. South Indian Hill St. 2: t. 181. 1932. **(PLATE 55: 476)**

Distribution: India, Sri Lanka and the Himalayas. *Habitat*: Grasslands.

Villous herbs; stem shortly creeping. Leaves opposite, to 2 x 1.5 cm; ovate, acute, rounded to cordate at base; petiole 5 mm long. Flowers axillary, solitary; pedicels 1.5 cm long; slender, erect; calyx 5-partite, lobes 6 mm long, lanceolate; corolla yellow, 1.5 cm across, deeply 5-lobed, lobes obovate; stamens 5, filaments inserted at the base of corolla tube, shortly united at base; ovary 1-celled, globose, ovules many, on free central placenta; style filiform. Capsule 6 mm across, globose, 5-valved; seeds many, trigonous.

Flowering & Fruiting: September - January.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

86. RANUNCULACEAE

1. Erect or decumbent herbs; leaves alternate; petiole base auriculate; achenes with short beaked styles **2**
1. Climbers; leaves opposite; petiole base not auriculate; achenes with accrescent feathery styles .... ***Clematis***

2. Tepals yellow; ovule basal .... ***Ranunculus***
2. Petals absent, sepals white; ovule pendulous **3**

3. Leaves ternate; stipules 2; flowers less than 1 cm wide .... ***Thalictrum***
3. Leaves simple; stipules 0; flowers more than 2 cm wide .... ***Anemone***

ANEMONE L.

506. Anemone rivularis Buch.-Ham. ex DC., Syst. Nat. 1: 211. 1817; Hook. f., Fl. Brit. India 1: 9. 1872; Gamble, Fl. Pres. Madras 4 (3). 1915; Fyson, Fl. South Indian Hill St. 2: t. 2. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; M. A. Rau in B. D. Sharma et al., Fl. India 1: 35. 1993. *Anemone wightiana* Wight & Arn., Prodr. 3. 1834. **(PLATE 55: 477)**

Distribution: Indo-Malesia and China. *Habitat*: Grasslands.

Perennial herbs, densely clothed with hairs at the base. Leaves 6-8 x 4-7 cm, thrice lobed, hairy, acute. Flowers solitary or several on simple scape of cymes, to 20 cm; involucre 3-partite; sepals 5, imbricate, petalloid, white, lower side blue, 11 x 8 mm, oblong-ovate; stamens numerous, filaments of various length; carpels numerous. Achenes in heads, 6 mm long, sessile, beaked.

Flowering & Fruiting: June - October.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of shoals and grasslands ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, I b 1 (Cairn Hills).

CLEMATIS L.

1. Leaves 2-3 pinnate; leaflets less than 5 x 2 cm; flowers white less than 1 cm wide; achenes with style less than 6 cm .... *C. gouriana*
1. Leaves 1-pinnate or lobed; leaflets more than 6 x 4 cm; flowers yellow or purple, more than 4 cm wide; achenes with style less than 3 cm **2**

2. Plants glabrous; leaf margin entire; petiole less than 5 cm; flowers dark purple, 7 cm wide, showy; filaments glabrous .... *C. munroiana*
2. Plants tomentose; leaf margin double dentate; petiole more than 10 cm; flowers yellowish, 4 cm wide, showy; filaments pubescent .... *C. wightiana*

507. Clematis gouriana Roxb. ex DC., Syst. Nat. 1: 138. 1817; Hook. f., Fl. Brit. India 1:4.1872; Gamble, Fl. Pres. Madras 3(2). 1915; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; M. A. Rau in B. D. Sharma et al., Fl. India 1:64.1993. **(PLATE 55: 478)**

Common names: Traveller's Joy (E); Hotte hambu, Thalejadari (K); Nikidakodi (M); Attumeesaikkodi, Muravalli (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Climbing herbs; young branches pubescent. Leaflets 3-7, 4-6 x 1.5-3 cm, ovate, acute at apex, rounded at base, nerves tomentose below. Panicles drooping, terminal and axillary, tomentose. Flowers white, 1 cm across; sepals 7 x 4 mm, oblong, obtuse, pubescent; stamens many, filaments 8 mm long, glabrous; carpels 10-15, pubescent. Achenes 3 x 1 mm, ovoid, hairy; style persistent, ca. 30 mm long.

Flowering & Fruiting: November - March.

Utility: Used in Ayurveda and Folk medicine. Bruised leaves and stems vesicant, poisonous.

Notes: Found as thickets along shola border ± 1800 m, common in Naduvattam.

KNS, Longwood, 16.05.1971, 4258 (FRC).

508. Clematis munroiana Wight, Illustr. 1: 5, t.1. 1831; Gamble, Fl. Pres. Madras 3(2). 1915; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; M. A. Rau in B. D. Sharma et al., Fl. India 1: 71. 1993. *Clematis smilacifolia* Hook.f., Fl. Brit. India 1: 3. 1872 p.p. **(PLATE 55: 479)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Climbing herbs; stem ridged, glabrous. Leaflets 1-3, to 12 x 7 cm, broadly ovate, cordate at base, acute at apex, glabrous; petioles to 10 cm long; petiolule smaller, glabrous. Flowers pedicelled, few to many, to 8 cm across; pedicels to 10 cm long; sepals oblong, acute, purplish brown; stamens many, filaments unequal, inner smaller, to 3 cm long, connective produced into a whip; carpels many, densely hairy; hairs erect white. Achenes 4 x 3 mm, ovoid, pubescent; style 5-6 cm long, feathery.

Flowering & Fruiting: September - October.

Notes: Found as thickets along shola border ± 1800 m, common in Thaishola.

509. Clematis wightiana Wall. ex Wight & Arn., Prodr. 2. 1834; Hook. f., Fl. Brit. India 1: 5. 1872; Gamble, Fl. Pres. Madras 3 (2). 1915; Fyson, Fl. South Indian Hill St. 2: t. 1. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; M. A. Rau in B. D. Sharma et al., Fl. India 1: 80. 1993. **(PLATE 55: 480)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Climbing shrubs, tomentose. Leaves 3-5 foliolate, leaflets 6 x 4 cm, ovate, acuminate, densely tomentose, crenate or lobed with spiny protuberance, base cordate; petiole to 3 cm, twinning. Panicles axillary or terminal, peduncles to 2.5 cm; sepals 4, yellow-brown, 18 x 12 mm, ovate, glabrous inside; stamens numerous, filaments pubescent below; carpels many; stigma pilose. Achenes in globose heads, pubescent.

Flowering & Fruiting: February - March.

Utility: Used in Folk medicine.

Notes: Found as thickets along shola border ± 2100 m, common in Sispara.

RANUNCULUS L.

1. Leaves entire; reniform to orbicular; petiole more than 25 cm; achenes more than 40, not compressed .... ***R. reniformis***
1. Leaves deeply dissected; reniform to orbicular; petiole less than 15 cm; achenes less than 30, compressed **2**

2. Sepals spreading; stamens more than 40; flowers more than 1.5 cm wide; achenes smooth .... ***R. diffusus***
2. Sepals reflexed; stamens less than 20; flowers less than 1cm wide; achenes tubercled .... ***R. wallichianus***

510. Ranunculus diffusus DC., Prodr. 1: 38. 1824; Hook. f., Fl. Brit. India 1: 19. 1872; Gamble, Fl. Pres. Madras 5 (4). 1915; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; M. A. Rau in B. D. Sharma et al., Fl. India 1: 129. 1993. *Ranunculus subpinnatus* Wight & Arn., Prodr. 4. 1834; Hook. f., Fl. Brit. India 1: 19. 1872; Gamble, Fl. Pres. Madras 5 (4). 1915; Fyson, Fl. South Indian Hill St. 2: t. 5. 1932. **(PLATE 55: 481)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Perennial, erect herbs, usually leafless when in flower, covered with spreading hairs. Leaves deeply 3-lobed; lobes cuneate, deeply incised; petioles dark violet. Flower solitary, 1.5- 2.5 cm across, pale yellow; peduncle terminal or leaf opposed. Sepals 5, calyx 6x 2 mm, spreading, hairy. Petals 5, free, obovate, calyx 9 x 6 mm. Achenes ovate, acute, compressed, ribbed on either side of margin, finely and evenly pitted; beak short, straight or hooked.

Flowering & Fruiting: August - October.

Utility: Used in Folk medicine.

Notes: Found in moist and shady shola floor ± 1800 m, common in Naduvattam.

511. Ranunculus reniformis Wall. ex Wight & Arn., Prodr. 3. 1834; Hook. f., Fl. Brit. India 1: 16. 1872; Gamble, Fl. Pres. Madras 5(4). 1915; Fyson, Fl. South Indian Hill St. 2: t. 4. 1932; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; M. A. Rau in B. D. Sharma et al., Fl. India 1: 126. 1993. *Ranunculus peninsularis* Saldanha, Fl. Karnataka 1: 91. 1984. **(PLATE 55: 482)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Annual or perennial herbs, pubescent. Leaves radical and cauline, base sheathing, lamina 6-7 x 5-6 cm, ovate, cordate at base, pubescent margins broadly crenate; petiole up to 6 cm. Flowers solitary or panicled, pedicels to 10 cm; sepals 5, imbricate, 8 x 5 mm, obovate, hairy outside; petals 10, in two rows, 8 x 6 mm, obovate, yellow, with a nectary at base; stamens numerous, lower up to 5 mm; carpels numerous, style curved, 1 mm. Achenes in heads, 2 mm long, beaked.

Flowering & Fruiting: April - May.

Notes: Found in moist and shady shola floor ± 2050 m, common in Parsons valley.

KNS, Bangithapal, 12.05.1963, 643 (FRC).

512. Ranunculus wallichianus Wight & Arn., Prodr. 4. 1834; Hook. f., Fl. Brit. India 1: 20. 1872; Gamble, Fl. Pres. Madras 5(4). 1915; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 1. 1983; Fyson, Fl. South Indian Hill St. 2: t. 6. 1932; M. A. Rau in B. D. Sharma et al., Fl. India 1: 131. 1993. **(PLATE 55: 483)**

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Prostrate perennial herbs, rooting at nodes. Leaves pinnately 3-5-dissected; leaflets 6 x 3 cm, obovate, 3-5-lobed, serrate, pubescent; petiole 5-18 cm long, sheathing at base. Flowers 10 mm across, solitary, leaf-opposed; pedicels 2 cm long ; sepals 5, free, 4 x 2 mm, oblong, hirsute; petals 5, yellow, 5 x 3 mm, obovate, obtuse; stamens many, filaments 4 mm long, glabrous; carpels many; style glabrous. Achenes 4 mm long, ellipsoid, shortly tubercled, beak short.

Flowering & Fruiting: June - October.

Notes: Found in moist and shady shola floor ± 1800 m, common in Naduvattam.

KNS, Longwood, 08.05.1963, 484 (FRC).

THALICTRUM L.

513. Thalictrum javanicum Blume, Bijdr. 2. 1825; Hook. f., Fl. Brit. India 1: 13. 1872; Gamble, Fl. Pres. Madras 4 (3). 1915; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 2. 1983; Fyson, Fl. South Indian Hill St. 2: t. 3. 1932; M. A. Rau in B. D. Sharma et al., Fl. India 1: 136. 1993. *Thalictrum glyphocarpum* Wight & Arn., Prodr. 2. 1834. **(PLATE 56: 484)**

Common names: Mamiri (K).
Distribution: India, Sri Lanka, China and Java. *Habitat*: Shola border.

Erect perennial herbs, to 50 cm high; stem glabrous. Leaves alternate, bipinnate; leaflets 5-9, 1.5 x 2 cm, obovate, rounded at base, crenate, glabrous, palmately nerved; petioles and petiolules filiform, glabrous; stipule auricled. Flowers 7 mm across, in terminal panicled cymes; pedicels to 5 cm long, filiform; sepals 4, to 3 x 2 mm, ovate, obtuse, white with woolly hairs at apex; stamens many, free, filaments glabrous. Achenes few, to 5 x 2 mm, ellipsoid, sessile, 9-ribbed, glabrous, black, with hooked style.

Flowering & Fruiting: June - October.

Utility: Used in Folk medicine. It is used for eye troubles, diuretic, dysentery, enteritis, fever etc.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Mukurthi. The plants from Maharashtra have 3-foliolate large leaves, while those of higher elevation have biternate leaves with generally 9 leaflets. The smaller biternate leaves seem to be merely phenotypic variants.

KNS, Bangithapal, 12.05.1963, 633 (FRC).

87. RHAMNACEAE

RHAMNUS L.

1. Erect shrubs to 4 m; branchlets spine-tipped; flowers 4-merous, in compact clusters; drupe 1-2 celled .... ***R. virgatus***

1. Straggling shrubs to 15-20 m; branchlets unarmed; flowers 5-merous, in elongate racemes; drupe 3-celled .... ***R. wightii***

514. Rhamnus virgatus Roxb., Fl. Ind. 2: 351. 1824; Gamble, Fl. Pres. Madras 222 (159). 1918; Fyson, Fl. South Indian Hill St. 2: t. 64. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 76. 1983. *Rhamnus hirsutus* Wight & Arn., Prodr. 165. 1834. *Rhamnus dahuricus* Pall. var. *hirsutus* (Wight & Arn.) Lawson in Hook. f., Fl. Brit. India 1: 639. 1875. **(PLATE 56: 485)**

Common names: Kottamullu (K).

Distribution: South India, the Himalayas to West China. *Habitat*: Shola forests.

Erect shrubs; branchlets ending in a spine. Leaves fascicled, elliptic, to 4 x 1.5 cm, chartaceous, puberulous below; nerves 3 or 4 pairs, base acute, margin serrulate, apex acuminate; petiole 1.2 cm; stipules lanceolate. Fascicles to 1 cm, axillary, to 10-flowered. Flowers 3 mm wide; pedicel 5 mm; bract ovoid. Calyx-lobes 4, ovate. Petals 4, yellow, obovate. Disk 0. Stamens 4. Ovary globose, 2-celled; styles 2; stigma capitate. Drupe 6 mm wide, 2-celled; pyrenes 2.

Flowering & Fruiting: January - June.

Utility: Used in Folk medicine.

Notes: Found in shola border ± 2050 m, common in Pykara.

PSU & NKK, Arambi, 06.02.1991, c 16 (Cairn Hills); KNS, Longwood, 09.05.1963, 262 (FRC).

515. Rhamnus wightii Wight & Arn., Prodr. 164. 1834; Hook. f., Fl. Brit. India 1: 639. 1875; Gamble, Fl. Pres. Madras 222(159). 1918; Fyson, Fl. South Indian Hill St. 2: t. 65. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 77. 1983; Bhandari & Bhansali in N.P. Singh et al., Fl. India 5: 197. 2000. **(PLATE 56: 486)**

Common names: Kokkuvalli (M); Peypulla (T).

Distribution: India, Sri Lanka and Nepal. *Habitat*: Shola forests.

Unarmed stragglers to liane. Leaves alternate, elliptic-oblong, to 10 x 4 cm, subcoriaceous, glabrous; nerves 7 pairs; base obtuse, margin serrulate-recurved, apex acuminate; petiole to 8 mm; stipules 0. Spikes axillary, also terminal, to 5 cm; peduncle 1 cm. Flowers 3 mm wide; pedicel 2 mm; bracts puberulous. Calyx 5-lobed; lobes ovoid. Petals 5, yellowish, cucullate. Disk adnate to calyx, pitted. Stamens 5. Ovary urceolate, 3-celled; styles 3; stigma discoid. Drupe 7 mm wide, 3- celled; seeds 3, conical, 3 mm wide.

Flowering & Fruiting: January - April.

Utility: Used in Ayurveda, Folk and Siddha medicine.

Notes: A typical shola species ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 27.01.1991, c 17 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 474 & 13.10.1995, 346 (TNFDH); KNS, Avalanche, 18.03.1969, 3668 (FRC).

88. ROSACEAE

1. Leaves compound **2**
1. Leaves simple **5**

2. Herbs **3**
2. Shrubs **4**

3. Receptacle fleshy; epicalyx smaller than calyx; leaves 3-5 foliolate; flowers yellow ..... ***Fragaria***
3. Receptacle dry; epicalyx larger than calyx; leaves palmate with 3-5 leaflets, or leaves imparipinnate .... ***Potentilla***

4. Achenes hidden in the hollowed, fleshy hypanthium .... ***Rosa***
4. Drupes forming a collective fruit, on an elevated torus .... ***Rubus***

5. Armed shrubs .... ***Prinsepia***
5. Unarmed shrubs or trees **6**

6. Pistil superior, not connate with hypanthium .... ***Prunus***
6. Pistil semi-inferior, connate with hypanthium, at least on lower half **7**

7. Bushy shrubs; leaves orbicular, small, hairy; pistil 2 in the basal half, adnate to hypanthium but free from each other .... ***Cotoneaster***
7. Trees; leaves large, elliptic-lanceolate; glabrous; pistil to 5, connate with each other and with hypanthium .... ***Photinia***

COTONEASTER Medikus

516. Cotoneaster buxifolius Wall. ex Wight, Ic. t. 992. 1845; Hook. f., Fl. Brit. India 2: 387. 1878; Gamble, Fl. Pres. Madras 446 (316). 1919; Fyson, Fl. South Indian Hill St. 3: t. 328. 1920; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 140. 1983. **(PLATE 56: 487)**

Common names: Hurunnay (K).

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Branched shrubs from a woody bole; branchlets rigid, downy. Leaves elliptic-ovate, 10 x 0.4 cm, coriaceous, base acute, margin recurved, apex acute, apiculate, glabrescent above, densely white, downy-tomentose below; petiole 2 mm. Inflorescence 2-6-flowered; bracts linear, 2 mm. Sepals 5, triangular, 2 mm, pubescent outside. Petals 5, pink, orbicular, 2 mm wide. Stamens ca 20; filaments subequal. Ovary inferior, 2-celled; ovules 2, basal; styles 2, slender, 1.2 mm. Drupe globose, 8 mm wide; seeds 4, ovoid, 4 mm.

Flowering & Fruiting: March - June.

Utility: Used in Folk medicine.

Notes: Found rocky slopes and outskirts of sholas ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 05.07.1994, 82 (TNFDH).

FRAGARIA L.

517. Fragaria nilgerrensis Schltr. ex Gay., Ann. Sci. Nat. Bot. ser. 4. 8: 206. 1857; Hook. f., Fl. Brit. India 2: 344. 1878; Gamble, Fl. Pres. Madras 443 (314). 1919; Fyson, Fl. South Indian Hill St. 2: t. 99 &326. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 140. 1983. *Fragaria elatior* Wight & Arn., Prodr. 300. 1834, non Ehrh. 1792. **(PLATE 56: 488)**

Distribution: Peninsular India. *Habitat*: Grasslands.

Perennial herb. Leaves 3 x 5 cm, subcoriaceous, hirsute, especially below; stipules sheathing; rachis to 7 cm long; mid-leaflets obovate, 3.5 x 2.5 cm, base cuneate, margin deeply serrate; laterals oblique, 2.5 x 2 cm. Cymes erect, to 5 cm long; peduncles golden villous. Petals elliptic, 5 mm, yellow. Stamens numerous. Pistils numerous, on a convex receptacle; ovule 1. Achenes numerous, on fleshy torus.

Flowering & Fruiting: February - April.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Mukurthi.

PSU & NKK, Kodanad, 16.03.1991, b 71 (Cairn Hills); KNS, Naduvattam, 14.05.1963, 285 (FRC).

PHOTINIA Lindly

1. Leaves acuminate at apex; petals villous; seeds triquetrous .... *P. serratifolia*
1. Leaves mucronate at apex; petals glabrous; seeds compressed .... *P. integrifolia*

518. Photinia integrifolia Lindl., Trans. Linn. Soc. London 13: 103. 1821, var. **sublanceolata** Miq., Fl. Ind. Bat. 1: 387. 1857; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 141. 1983. *Photinia notoniana* Wight & Arn., Prodr. 1: 302. 1834; Hook. f., Fl. Brit. India 2: 380. 1878; Gamble, Fl. Pres. Madras 445 (316). 1919; Fyson, Fl. South Indian Hill St. 3: t. 327. 1920. **(PLATE 56: 489, 489 a)**

Common names: Kodibikki (K); Choluvan, Choluvannamaram, Kalappamaram (M); Koda bikki, Kodibikki (T).

Distribution: India and Sri Lanka. *Habitat*: Shola forests.

Trees, to 10 m high; bark reddish-brown. Leaves simple, alternate; stipules subulate, lateral, deciduous; petiole 25-32 mm, stout, glabrous, grooved above; lamina 6-13 x 5-7.5 cm, elliptic, or obovate, base acute or oblique, apex obliquely acuminate, margin entire, glabrous, coriaceous; lateral nerves 10-14 pairs, slender, parallel, faint, intercostae reticulate, faint. Flowers bisexual, pinkish-white, in much branched terminal corymbs; peduncle, branches of inflorescence and pedicels with a cover of short appressed hairs; bracteoles absent; calyx tube adnate to the ovary; lobes 5, short, persistent; petals 5, spreading, claws of the petals glabrous; stamens 20, inserted on the mouth of the calyx; ovary half inferior, densely pilose at apex, 2-3-celled, ovules 2 in each cell; styles 2 to 3, more or less connate at base; stigma truncate. Fruit

a drupe, reddish-purple with 2 pyrenes each in a crustaceous endocarp; seeds compressed, pointed at both ends.

Flowering & Fruiting: December - April.

Propagation: Seeds are viable for a week. Matured fruits are collected and dried in sunlight, then sown in well prepared mother bed. Rooting medium of mother bed has red shola soil, sand 1:1.Germination noticed after 3 to 4 months. Germination percentage is of 10 %.

Notes: A typical shola tree ± 2100 m, common in Pykara.

PSU & NKK, Outcherloney, 02.02.1991, d 22 (Cairn Hills); PSU & NKK, Kodanad, 14.07.1994, 94 & 14.11.1994, 566 (TNFDH); KNS, Dodabetta, 25.02.1977, 6762 (FRC).

519. Photinia serratifolia (Desf.) Kalkman, Blumea 21: 424. 1973, var. **serratifolia**; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 141. 1983. *Crataegus serratifolia* Desf., Cat. Hort. Paris (ed. 3) 408. 1829. *Photinia lindleyana* Wight & Arn., Prodr. 302.1834; Hook. f., Fl. Brit. India 2:380.1878; Gamble, Fl. Pres. Madras 445 (315). 1919. **(PLATE 56: 490)**

Common names: Kodibikki (K).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 15 m high, branchlets glabrous, some times hairs when young. Leaves simple, alternate; stipule subulate, lateral, cauducous; petiole 15-30 mm long, stout, grooved above, glabrous; lamina 8.5-18 x 3.5-8.5 cm, oblong, elliptic, ovate, elliptic-ovate or ovate-lanceolate, base acute to round, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves 5-14 pairs, pinnate, slender, faint, secondary lateral present, intercostae reticulate, faint. Flowers bisexual, white, 3 mm across, in terminal corymbs; bracts small, subulate, cauducous; calyx obconical, upper half free from the ovary, glabrous; sepals 5, triangular, persistent; petals 5, 3-4.5 x 3-3.5 mm, suborbicular to broadly ovate, shortly but distinctly clawed, slightly hairy inside at base; stamens 16-20, free, inserted on the mouth of the calyx; filaments upto 3 mm; ovary half inferior, hairy on the free top, 2-celled, ovules 2 in each cell, sessile; styles 2, free, glabrous. Fruit a drupe, subglobular to obovoid with a more or less flattened apex, upper part of the hypanthium and sepals closely appressed against the top of the fruit; seeds 2-4, obovoid, triquetrous.

Flowering & Fruiting: March - May.

Notes: A common shola tree ± 1800 m, common in Naduvattam.

PSU & NKK, Pykara, 26.01.1991, 21 (TNFDH); TRR, Coonoor, 11.05.1932, 2791 (FRC).

POTENTILLA L.

520. Potentilla leschenaultiana Ser. in DC., Prodr. 2:584.1825; Hook. f., Fl. Brit. India 2:350.1878,p.p.; Gamble, Fl. Pres. Madras 443 (314). 1919; Fyson, Fl. South Indian Hill St. 2: t. 100. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 141. 1983. **(PLATE 56: 491)**

Distribution: Western Himalayas and Southern Western Ghats. *Habitat*: Shola forests.

Robust, stoloniferous, villous herbs; rootstock stout; shoots several, radiating ascending, to 30(45) cm. Leaves odd-pinnate (mostly 5-foliolate), to 6 x 4 cm, chartaceous, coarsely toothed, whitish below; petioles 4-10(15)cm, slender; stipules persistent; terminal leaflet obovate, 3 x 1.5 cm; laterals oblique, to 1.8 x 1 cm; petiolules 2 mm. Inflorescence ascending, corymbose, to 30(45) cm; peduncle to 10(20) cm. Flowers 1.2 cm wide; pedicel to 1.5 cm; bracts lanceolate, 5 mm. Sepals 5, lanceolate, 5 x 3 mm, strigose outside. Petals 5, obovate, bright yellow, 5 x 4 mm, retuse. Stamens ca 20; filaments subequal. Pistils numerous; ovary ovoid; style slender. Achene cluster on rounded receptacle, 4 mm wide.

Flowering & Fruiting: February - May.

Notes: Found in open areas and waste lands ± 2000 m, common in Parson's valley.

PRINSEPIA Royle

521. Prinsepia utilis Royle, Ill. T. 38. F. 1. 1834; Hook. f., Fl. Brit. India 2: 323.1878p.p.; Gamble, Fl. Pres. Madras 445 (316). 1919; Fyson, Fl. South Indian Hill St. 2: t. 95. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 141. 1983. **(PLATE 57: 492)**

Distribution: The Himalayas, Nilgiris and Kodaikanal. *Habitat*: Shola border.

Spiny shrubs, branches green, round and smooth. Leaves stalk very short, leaves elliptic-acute, finely serrate except towards the base, glabrous. Flowers in the axiles of the upper leaves; pedicels 1.5-2 cm long, with 2-3 minute scales; buds top-shaped, purplish brown in the lower half. Sepals concave round. Petals round with crinkled edge, white. Stamens numerous with yellow anthers, from a conspicuous disc. Ovary 1-celled; ovules 2 attached to one side, pendulous; style basal, bent below the large

flat stigma. Fruit oblong, rounded at each end, with the persistent style attached near the base; seed one, erect with thick cotyledons.

Flowering & Fruiting: June - October.

Utility: Used in Folk medicine.

Notes: Common in the Himalayas ± 2000 m, Frequent in Thalakuntha.

PSU & NKK, Wenlockdowns, 29.01.1991, 23; Kodanad, 05.07.1994, 87 & 31.08.1994, 296 (TNFDH); KRS, Governor's shola, 21.02.2008, 18821 (FRC).

PRUNUS L.

522. Prunus ceylanica (Wight) Miq., Fl. Ind. Bot. 1: 366. 1855; Hook. f., Fl. Brit. India 2:350.1878p.p.; Gamble, Fl. Pres. Madras 443 (314). 1919; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 142. 1983. *Polydontia zeylanica* Wight, Illustr. 1: 203. 1840, "Polyodontia". *Pygeum zeylanicum* Bedd., Fl. Sylv. t. 59. 1871. *Pygeum acuminatum* Colebr., Trans. Linn. Soc. London 12: 300. t.18. 1818; Hook. f., Fl. Brit. India 2: 318. 1878; Gamble, Fl. Pres. Madras 439 (311). 1919, non *Prunus acuminata* (Wall.) Dietr. 1803. *Pygeum wightianum* Blume ex Muell. in Walp., Ann. 4: 642. 1857; Hook. f., Fl. Brit. India 2: 319. 1878; Gamble, Fl. Pres. Madras 439 (311). 1919. *Pygeum gardneri* Hook. f., Fl. Brit. India 2: 321. 1878; Gamble, Fl. Pres. Madras 439 (311). 1919; Fyson, Fl. South Indian Hill St. 3: t. 324. 1920. *Pygeum sisparense* Gamble, Bull. Misc. Inform. Kew 1918: 238. 1918; Gamble, Fl. Pres. Madras 438 (311). 1919. **(PLATE 57: 493)**

Common names: Attanaripongu, Irattani, Karmavu, Naikambagam, Korandamaram, Rettiyan (M); Kodalai, Palankacchi (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Evergreen trees, to 25 m high, bark 6-8 mm thick, brownish-black, rough, vertically fissured and shallowly horizontally cracked forming thin tessellate flakes; branchlets prominently lenticellate. Leaves simple, alternate; stipules small, lateral, caudücous; petiole 10-22 mm, stout, grooved above, glabrous; lamina 10-21 x 4.5-8.5 cm, ovate, ovate-lanceolate, oblong-lanceolate, or elliptic-ovate, base acute, round or oblique, apex acuminate or obtusely acute, margin entire, glabrous, coriaceous; lateral nerves 5-9 pairs, pinnate, prominent, slender, intercostae reticulate, prominent, 2 pitted glands at base on either side of the midrib often present. Flowers bisexual, 5-6 mm across,

white, in axillary racemes; bracts forming a cone in buds, deciduous; calyx tube campanulate; lobes 5-6, ovate, acute or obtuse, densely hairy; petals 5-6, oblong, tomentose without; stamens 20-30; filaments slender, incurved; anthers small; ovary sessile, inferior, 1-celled, glabrous, ovules 2, pendulous; style 1, subulate; stigma capitate. Fruit a drupe 20-25 x 35-37 mm, depressed globose, obscurely 2-lobed, glabrous; seeds 2, globose.

Flowering & Fruiting: September - April.

Utility: Used in Folk medicine. Bark is used in stomachache.

Propagation: The seeds are viable for one month. The seeds are soaked in water for a day or two and then sown in well prepared mother bed containing red soil and sand. Germination percentage is about 20 %.

Notes: Fairly common in semi-evergreen and evergreen forests, irregularly seen in sholas ± 1400 m, common in Lambs rock.

KNS, Burliar-Coonoor road, 23.02.1977, 6637 (FRC).

ROSA L.

523. Rosa leschenaultiana Red. & Thory ex Wight & Arn., Prodr. 301. 1834; Hook. f., Fl. Brit. India 2: 368. 1878; Gamble, Fl. Pres. Madras 444 (315). 1919; Fyson, Fl. South Indian Hill St. 2: t. 101. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 143. 1983. **(PLATE 57: 494)**

Common names: Katturosa (M); Kattu rose (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Spreading, scandent, armed shrubs; prickles hooked. Leaves alternate, odd-pinnate, to 10 x 8 cm, chartaceous; petiole 2 cm; stipules adnate to petiole base, to 1.5 cm, glandular; leaflets 3 pairs, sharply serrate; terminal leaflet oblong-ovate, to 6 x 3 cm, petiolule 1 cm; laterals oblong-elliptic, to 4.5 x 2.5 cm, subsessile. Flower(s) solitary or in a few-flowered corymbs; pedicel to 3 cm, with copious glands. Calyx flask-shaped, 4 mm wide, very glandular; lobes 5, lanceolate, foliaceous, to 2.5 x 0.6 cm, glandular, reflexed with age. Corolla white, to 7 cm wide; petals 5, obcordate, 3 cm wide, imbricate. Stamens numerous; filaments 1 cm. Pistils numerous, superior. Ovary 1-celled; ovules 2, pendulous. Fruit(cluster of achenes) ovoid; pericarp bony, enclosed in the accrescent fleshy hypanthium; seed with thin testa; endosperm 0.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk medicine.

Notes: Straggling on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, 24 (TNFDH); KNS, Kotagiri, 08.05.1963, 451(FRC).

RUBUS L.

1. Leaves simple, coriaceous; stipules elaborately incised, free from petiole, deciduous 2
1. Leaves pinnately compound, chartaceous; stipules linear or lanceolate, jointed to the petiole, persistent 3

2. Bracts broadly ovate or obovate, lacinate at apex .... *R. fairholmianus*
2. Bracts pectinately lacinate with linear segments .... *R. glomeratus*

3. Leaves 3-foliolate; leaflets rounded; flowers white; fruits orange .... *R. ellipticus*
3. Leaves 5-7-foliolate; leaflets acute; flowers pink or red; fruits black or purple .... *R. niveus*

524. Rubus ellipticus Smith in Rees, Cyclop. 30: Rubus. n.16. 1815; Hook. f., Fl. Brit. India 2: 336. 1878; Gamble, Fl. Pres. Madras 441 (313). 1919; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 143. 1983. *Rubus gowreephul* Roxb., Fl. Ind. 2: 517. 1832. *Rubus wallichianus* Wight & Arn., Prodr. 298. 1834. **(PLATE 57: 495)**

Common names: Yellow Himalayan raspberry (E); Nuchattae (K); Cheemullu, Mullippazham (M); Mullupazham (T).

Distribution: India, Sri Lanka and Myanmar. *Habitat*: Shola forests.

Ramblers; stems covered with red bristles; prickles recurved, leaflets 5 x 5 cm, obovate to orbicular, serrulate; hispid below; nerves 7 or 8 pairs, spiny below; petiolule 5 mm long. Panicle axillary or terminal, fulvous tomentose; bracts 5 mm long, ovate, acute. Flowers white; pedicels 1 cm long, villous; sepals 6 x 4 mm, ovate, acute, united at base, pubescent; petals 7-8 mm long, obovate; torus densely villous; ovaries glabrous. Drupes 1.5 mm across, glabrous, deep red.

Flowering & Fruiting: November - March.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 26.01.1991, d 25 (Cairn Hills); PSU & NKK, Kodanad, 05.07.1994, 88 & 31.08.1994, 55 (TNFDH); KNS, Kodanad, 09.05.1963, 254 (FRC).

525. Rubus fairholmianus Gard., Calcutta J. Nat. Hist. 8: 6. 1847; Gamble, Fl. Pres. Madras 441 (312). 1919; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 143. 1983. *Rubus moluccanus* sensu Hook.f., Fl. Brit. India 2: 330. 1878p.p., non L. 1753. **(PLATE 57: 496)**

Common names: Erumacheechi, Vettilamullu (M); Kammal pazham (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Rambling shrubs. Branchlets fulvous tomentose; prickles slightly recurved. Leaves ovate, 6-11 x 5.5-10.5 cm, 9-12-lobed, lobes acute, base cordate, margin irregularly serrate, upper surface rugose, lower surface white-tomentose, basally 5-nerved, coriaceous. Racemes about 10 cm long; bracts broadly ovate, shallowly laciniate. Flowers about 2 cm across; calyx cupular, lobes lanceate; petals broadly ovate, margins crispate. Fruits reddish.

Flowering & Fruiting: August - December.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Western catchment.

PSU & NKK, Anumapuram, 29.01.1991, I d 27 (Cairn Hills).

526. Rubus glomeratus Blume, Bijdr. 1111. 1826; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 143. 1983. *Rubus fulvus* Focke, Biblioth. Bot. 17: 81. 1911, non Sudre 1902; Gamble, Fl. Pres. Madras 441 (313). 1919. *Rubus moluccanus* sensu Hook. f., Fl. Brit. India 2: 330. 1878 p.p., non L. 1753. **(PLATE 57: 497)**

Common names: Black-cherry (E); Kukunna balli (K); Kattumunthiri, Mulluvettila (M).

Distribution: Peninsular India. *Habitat*: Shola forests.

Straggling shrubs. Stem reddish, densely cottony hairy. Leaves to 8 x 8 cm, shallowly 5-lobed, cordate at base, rugose above, densely fulvous, cottony tomentose below; petiole 4 cm long. Flowers in terminal panicles, bracts 8 mm long, densely hairy; bracteole bifid, filiform; pedicels 7 mm long; sepals 10 mm long, united below; petals 4 x 2 mm, obovate; ovaries glabrous. Drupe 2 mm across, ovoid, yellow.

Flowering & Fruiting: November - January.

Notes: As thickets along margins of sholas ± 2100 m, common in Mukurthi.

527. Rubus niveus Thunb., Diss. Rub. 9. t.1. f.3. 1813; Gamble, Fl. Pres. Madras 442 (313). 1919; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 143. 1983. *Rubus leucocarpus* Arn., Nova Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 16. 1834. *Rubus niveus* Thunb. var. *subglaber* (Thw.) Gamble, Fl. Pres. Madras 442 (313). 1919. **(PLATE 57: 498)**

Common names: Snowpeaks raspberry, Mysore raspberry (E); Komuli, Gomuli Ceylon (K); Karimcheechi (M); Kolalindu (T).

Distribution: Indo-Malesia and China; in India temperate Himalayas and South India.
Habitat: Shola forests.

Rambling shrubs. Branches glaucous; prickles few, 6 mm long. Leaflets to 5 x 3 cm, elliptic, acute at either ends, subsessile, spinous-serrate, white-tomentose beneath, glabrous above; nerves 7 pairs. Racemes 2-3 together, axillary. Flowers pink, 6-8 mm across; bracts 4 mm long, lanceolate, entire; pedicels 1 cm long, slender, villous; sepals 6 mm long, lanceolate, united at base; petals 3 x 2 mm, obovate; ovaries densely pubescent. Drupe 2 x 1 mm, ovoid, acute, subglabrous.

Flowering & Fruiting: April - May.

Utility: Used in Folk medicine.

Notes: As thickets along margins of sholas ± 2050 m, common in Governor shola.

PSU & NKK, Kodanad, 08.08.1994, 600 (TNFDH); KNS, Kotagiri, 08.05.1963, 548 (FRC).

89. RUBIACEAE

1. Herbs & climbers 2
1. Trees or shrubs 9

2. Climbers 3
2. Erect, diffuse or prostrate herbs 4

3. Flowers solitary, 4-merous; leaves linear, sessile, 1-nerved .... ***Galium***
3. Flowers in dichasial cymes, 5-merous; leaves ovate-obovate, petiolate, 5-7 nerved .... ***Rubia***

4. Ovules 1 per cell, on axile or apical placenta 5
4. Ovules many per cell, on septal placenta 6

5. Flowers 2-morphic, in terminal corymbs; corolla lobes incurved; ovules pendulous ..... *Knoxia*
5. Flowers 1-morphic, in axillary fascicles or terminal heads; corolla lobes spreading; ovules basal with axile placentation .... *Spermacoce*

6. Calyx-teeth 5; capsule dehiscing by broad gaping valves .... *Ophiorrhiza*
6. Calyx-teeth 4; capsule dehiscing apically 7

7. Acaulescent herbs, root-stock thick, clothed with dried leaf-bases; leaves in dense, basal rosettes, sessile .... *Pleiocraterium*
7. Erect or prostrate not a acaulescent herbs, root-stock not thick, not clothed with dried leaf-bases; leaves decussate 8

8. Leaf base truncate to rounded; seeds less than 15-30, with a ventral cavity .... *Neanotis*
8. Leaf base acute or decurrent; seeds more than 30-40, pitted or reticulate .... *Oldenlandia*

9. Plants foetid .... *Saprosma*
9. Plants not foetid 10

10. Leaves distichous; calyx laterally spilt; corolla-lobes beaked .... *Lasianthus*
10. Leaves deccusate; calyx not spilt; corolla-lobes not beaked 11

11. Corolla-lobes twisted or imbricate in bud 12
11. Corolla-lobes valvate in bud 14

12. Flowers 5-merous; inflorescence a panicle .... *Wendlandia*
12. Flowers 4-merous; inflorescence a panicle or coryms 13

13. Styles as long as corolla-tube; stigma 2-fid .... *Ixora*
13. Styles much longer than corolla-tube; stigma fusiform .... *Pavetta*

14. Ovules numerous, on axile or septal placenta; capsule 15
14. Ovules 1 per cell, on basal or apical placenta; drupe 16

15. Trees; placenta axile .... *Cinchona*
15. Herbs; placenta septal .... *Hedyotis*

16. Infloresncene axillary; placenta laterally apical .... *Canthium*
16. Infloresncene terminal; placenta basal .... *Psychotria*

CANTHIUM Lam.

528. Canthium neilgherrense Wight, Ic. t. 1064. 1846; Hook. f., Fl. Brit. India 3: 133. 1880; Fyson, Fl. South Indian Hill St. 3: t. 364. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 2.1987. *Plectronia neilgherrensis* (Wight) Bedd., For. Man. Bot. 134/6. 1872; Gamble, Fl. Pres. Madras 625 (441). 1921. **(PLATE 57: 499)**

Common names: Woppe (K).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Large shrubs. Leaves to 6 x 3 cm, elliptic to obovate, subcoriaceous; domatia glandular; petiole to 5 mm long; stipules ovate, acute. Flowers 3-12 together in axillary fascicles; pedicels 3 mm long; calyx 2 mm long, obconical, lobes triangular, glabrous; corolla tube 4 mm long, campanulate, densely reflexed hairy below the stamens and erect hairy above the stamens in side; lobes 3 x 1.5 mm, oblong; style hispid. Drupe 13 x 7 mm, obovoid.

Flowering & Fruiting: October - March.

Notes: Found in margins and inside of the sholas ± 1700 m, common in Thaishola.

PSU & NKK, Kodanad, 08.08.1994, 347 (TNFDH); KNS, Longwood, 21.04.1964, 1212 (FRC).

CINCHONA L.

529. Cinchona calisaya Wedd., Ann. Sci. Nat. Bot. ser. 3, 10: 6. 1848; Gamble, Fl. Pres. Madras 589 (416). 1921; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 3.1987. *Cinchona calisaya* Wedd. var. *ledgeriana* Howard, Quinol. Ind. Plant. 84. 1876; Gamble, Fl. Pres. Madras 589 (416). 1921. *Quinquina ledgeriana* (Howard) Kuntze, Revis. Gen. Pl. 1: 295. 1891. **(PLATE 57: 500)**

Common names: Quinine (E); Chinchona (T).

Distribution: Native of South America. *Habitat*: Planted.

Erect trees up to 20 m tall; branches spreading; bark thick, longitudinally and transversely fissured. Leaves opposite, 8-10 x 3.5-4.5 cm, oblong- elliptic, glabrous, glossy on the upper surface; petioles up to 1-2 cm long; stipules interpetiolar, conical, 1.5 x 1 cm. Flowers small, numerous, purplish to rose, fragrant, in few-flowered cymes on terminal, pyramidal panicles; bracts minute, ovate-acute. Calyx turbinate; lobes 5, minute, valvate. Corolla purplish to rose; tube 0.8-1.6 cm long, tomentose; lobes 5, lanceolate, spreading, with a fringe of white hairs along the margins. Stamens 5, not exserted; filaments 4-6 mm long; anthers 2-celled, dehiscing longitudinally. Ovary inferior, 2-celled, with numerous ovules on axile placentae; style 1, 1.8-2.2 cm long, with a 2-fid stigma. Fruit an ovoid-acute septicidal capsule 6-9 x 8 mm; seeds numerous, yellow, winged; wings elliptic-lanceolate, lacerate on the margins.

Flowering & Fruiting: September - January.

Utility: Used in Folk and Modern medicine.

Notes: Plantations in Tea estates ± 1800 m, common in Naduvattam.

GALLIUM L.

530. Gallium asperifolium Wall. in Roxb., Fl. Ind. 1: 381. 1820; Gamble, Fl. Pres. Madras 656 (462). 1921; Fyson, Fl. South Indian Hill St. 3: t. 371. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 4.1987. *Galium mollugo* Hook. f., Fl. Brit. India 3: 207. 1880, non L. 1753. **(PLATE 58: 501)**

Distribution: India, Afghanistan and Thailand. *Habitat*: Shola forests.

Scabrid slender vines, stem 4-angled. Leaves whorled, 6-8, to 1.5 x 0.5 cm, oblong, apex apiculate, hirsute, subsessile; stipules absent. Flowers axillary, solitary, 4-toothed; corolla 1.5 mm across; stamens exserted; ovary 2-celled, ovule one in each cell, style 2 forked.

Flowering & Fruiting: March - May.

Utility: Used in Folk medicine.

Notes: Found in margins of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 27.01.1991, a 24 (Cairn Hills); PSU & NKK, Kodanad, 08.08.1994, 214 & 05.10.1995, 182 (TNFDH).

HEDYOTIS L.

1. Cymes in terminal panicles 2
1. Cymes axillary .... *H. hirsutissima*

2. Stipules rounded, the margin simply pectinate, not usually glandular .... *H. articularis*
2. Stipules elongate, the margin pinnatisect 3

3. Calyx glabrous .... *H. leschenaultiana*
3. Calyx pubescent .... *H. bourdillonii*

531. Hedyotis articularis R. Br. ex Wight & Arn., Prodr. 407. 1834, ssp. **articularis**; Hook. f., Fl. Brit. India 3: 51. 1880; Fyson, Fl. South Indian Hill St. 2: t. 138. 1932; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 6.1987. *Oldenlandia articularis* (R. Br. ex Wight & Arn.) Gamble, Fl. Pres. Madras 597 (421). 1921. **(PLATE 58: 502)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Coarse shrubs; stem articulated by persistent stipules. Leaves to 18 x 8 mm, lanceolate, acute, very coriaeous, nearly sessile, margins recurved, nerves 4 pairs, strong, thick, reddish, tomentose, stipule 7 mm long, teeth 6, unequal, hispid. Cymes 1.5-3 cm across, terminal, densely clustered, hirsute. Flowers 9 mm long, sessile, 10-20 in a cymes; calyx campanulate, lobes acute corolla tube slender; lobes oblong, pink, margin recurved; stamens included, anthers linear. Capsule 6 x 4 mm, obovoid, pubescent; seeds obovoid, black.

Flowering & Fruiting: October - January.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

PSU & NKK, Thaishola, 18.02.1991, II a 32 (Cairn Hills); KNS, Kundah RF, 12.05.1963, 602 (FRC).

532. Hedyotis bourdillonii (Gamble) Rao & Hemadri, Indian For. 99: 378. 1973; Sasidh., Fl. Periyar Tiger Reserve 174. 1998; Dutta & Deb, Taxonomic Revision *Hedyotis* 89. 2004. *Oldenlandia bourdillonii* Gamble, Bull. Misc. Inform. Kew 1919: 404. 1919 & Gamble, Fl. Pres. Madras 598 (422). 1921. *Hedyotis silent-valleyensis* Vajr., Rathakr. & Bhargavan, Journ. Bombay Nat. Hist. Soc. 80: 402. 1983 (1984). **(PLATE 58: 503)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Margins of grasslands.

Stout shrubs; stem pubescent, 4-angled. Leaves to 4.5 x 2 cm, ovate, acute, membraneous, acute at base, pubescent below, scabrous above; nerves 3 pairs, near the base petiole 5 mm long; stipule ovate, teeth many, hispid. Panicles terminal 7 cm across, densely hirtus. Flowers shortly pedicelled or sessile, 9 mm long; calyx 3 mm long, lobes 1 x 1 mm, ovate, obtuse with a black gland at tip corolla tube 3 mm long, sparsely villous, within, lobes oblong, 3 mm long, pink; anthers 2 mm long, sessile attached at the middle of the corolla tube; style 6.5 mm long.

Flowering & Fruiting: November - February.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

533. Hedyotis hirsutissima Bedd., Madras J. Lit., Sci. ser. 3, 1: 49. 1864 & Ic. t.2. 1868-1874; Hook. f., Fl. Brit. India 3: 55. 1880; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 8.1987; Dutta & Deb, Taxonomic Revision *Hedyotis* 63. 2004. *Oldenlandia hirsutissima* (Bedd.) O.Ktze., Rev. Gen. Pl. 1: 292. 1891; Gamble, Fl. Pres. Madras 599 (422). 1921. **(PLATE 58: 504)**

Distribution: Endemic to southern Western Ghats. *Habitat*: Grasslands.

Shrubs or undershrubs, 50-150 cm long; branches leafy above and with scars of stipules and fallen leaves below; stem obtusely angular or terete, glabrous. Leaves opposite, sessile or shortly petioled, 1-5 x 0.8-2.5 cm, ovate or elliptic-lanceolate, mucronate at apex, attenuate at base, coriaceous, densely yellowish hirsute on both surfaces. Inflorescence axillary, peduncled, panicle of few flowered corymbose cymes; branches slender, shorter than leaves, dense hirsute. Flowers 18-20 mm long, hirsute outside, bracteate; pedicel 1-2 mm long; bracts foliaceous, 1-4 x 0.8-2 mm, linear-lanceolate. Hypanthium 1.5-3 mm long; calyx limb 1-2 mm long; lobes 4, 2.5-3.5 mm long, lanceolate, acuminate; midnerve prominent. Corolla campanulate; tube 12-13 mm long, dense pubescent inside, lobes 4, ovate, acute, 5.5-6.5 mm, minute pubescent inside. Stamens 4, exserted; filaments 2-3.5 mm long, adnate at the throat; anthers 1-2 mm long, oblong-linear. Ovary 1-1.5 mm long; ovules many; style 8-9 mm long, slender; stigma bilobed, 0.5-1 mm long, fleshy, pilose. Capsule 2-3 x 2-2.5 mm, globose, top enclosed within calyx lobes, hirsute; seeds 0.7-1 x 0.5-0.7 mm, angular, narrowly winged; exotesta reticulate, brownish.

Flowering & Fruiting: November - March.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Sispara.

534. Hedyotis leschenaultiana DC., Prodr. 4: 422. 1830, var. **leschenaultiana**; Deb & Dutta, Taxon 34: 296. 1985; Dutta & Deb, Taxonomic Revision *Hedyotis* 75. 2004. *Hedyotis stylosa* R. Br. ex Wight & Arn., Prodr. 407. 1834; Hook. f., Fl. Brit. India 3: 51. 1880; Fyson, Fl. South Indian Hill St. 2: t. 137. 1932. *Oldenlandia stylosa* (R. Br. ex Wight & Arn.) O. Ktze., Rev. Gen. Pl. 1: 292. 1891; Gamble, Fl. Pres. Madras 598 (422). 1921; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 9.1987. *Oldenlandia anamalayana* Gamble, Bull. Misc. Inform. Kew 1920: 67. 1920 & Gamble, Fl. Pres. Madras 599 (422). 1921. *Hedyotis anamalayana* (Gamble) R. Rao & Hemadri, Indian For. 99: 378. 1973.

Oldenlandia sisparensis (Gage) Gamble, Fl. Pres. Madras 599 (422). 1921. **(PLATE 58: 505)**

Distribution: Endemic to Southern Western Ghats. *Habitat:* Shola forests.

Stout shrubs, to 50 cm high; stem 4-angled, glabrous or pubescent along 4 lines. Leaves ovate, acute, rounded at base, glabrous, nerves 5 pairs; petiole 5 mm long; stipule ovate, laciniate, densely hirtus. Cymes terminal and upper axillary, 3-5 cm across, panicled; pedicel 5 mm long, stout, glabrous; calyx limb 2 mm long, lobes obtuse, glabrous; corolla pink, 8 mm long, tube slender, villous within, lobes 4 mm long, oblong, obtuse, spreading; anthers 1 mm long, sessile, adnated by the centre; style 6 mm long.

Flowering & Fruiting: November - March.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Dodabetta.

PSU & NKK, Wenlockdowns, 27.01.1991, II a 25 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 148 & 10.05.1995, 52 (TNFDH); KNS, Dodabetta, 08.02.1963, 35A (FRC).

IXORA L.

535. Ixora notoniana Wall. ex G. Don, Gen. Hist. 3: 571. 1834; Hook. f., Fl. Brit. India 3:139.1880; Gamble, Fl. Pres. Madras 630 (444).1921; Fyson, Fl. South Indian Hill St. 2: t. 142. 1932; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 11.1987. *Ixora saulierei* Gamble, Bull. Misc. Inform. Kew 1920: 247. 1920 & Gamble, Fl. Pres. Madras 630 (445). 1921. **(PLATE 58: 506)**

Common names: Iramburippi (M); Kalilambili (T).

Distribution: Endemic to Southern Western Ghats. *Habitat:* Shola forests.

Trees. Leaves to 16 x 7 cm, elliptic-obovate, apex obtuse or acute, slightly mucronate, shining above, nerves impressed above; petiole to 1.5 cm. Corymbs axillary; pedicel to 4 cm; calyx teeth 1 mm, triangular. Berry 4 mm across, globose.

Flowering & Fruiting: July - August.

Notes: Found in outskirts and inside the sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 02.08.1995, 281 (TNFDH); KNS, Longwood, 08.05.1963, 472 (FRC).

KNOXIA L.

1. Stipule bristles glabrous .... *K. wightiana*
1. Stipule bristles hirsute .... *K. sumatrensis*

536. Knoxia sumatrensis (Retz.) DC., Prodr. 4: 570. 1830, var. **sumatrensis**; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 12.1987. *Spermacoce sumatrensis* Retz., Obs. Bot. 4: 23. 1786. *Knoxia corymbosa* Willd., Sp. Pl. 582. 1798; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622 (439). 1921. *Knoxia mollis* Wight & Arn., Prodr. 439. 1834; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622 (439). 1921; Fyson, Fl. South Indian Hill St. 2: t. 141 & 362. 1932. **(PLATE 58: 507)**

Distribution: Indo-Malesia and Australia. *Habitat*: Marshy areas.

Erect or diffuse pubescent herbs. Leaves 6-10 x 1.5-3 cm, linear-lanceolate to oblanceolate, base acute, apex acuminate, glabrescent above and pubescent below, lateral veins ca 10 pairs; stipules sheathing with pectinate bristles; petiole to 1 cm long. Inflorescence terminal elongating lax corymbose cymes. Flowers 4-merous. Calyx lobes 4, small, subequal, acute. Corolla ca 3 mm long, funnel-shaped, pale-violet, pubescent within near the throat, lobes small. Stamens 4, exserted or inserted. Ovary ca 1 mm across; style 1.5-2.5 mm, filiform; stigma 2-lobed. Capsules 2-2.5 mm long, narrowly ellipsoid, 2-seeded. Seeds small, reddish-brown.

Flowering & Fruiting: August - September.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Mukurthi.

PSU & NKK, Pykara, 27.01.1991, II a 29 (Cairn Hills); PSU & NKK, Kodanad, 25.11.1994, 243 & 02.08.1995, 450 (TNFDH).

537. Knoxia wightiana Wall. ex Wight & Arn., Prodr. 440. 1834; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622 (439). 1921; Fyson, Fl. South Indian Hill St. 3: t. 363. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 12.1987. **(PLATE 58: 508)**

Distribution: Peninsular India. *Habitat:* Marshy areas.

Glabrous woody herbs. Leaves to 6 x 1 cm, linear-lanceolate, curved, folded, glabrous, sessile; stipules ovate, 6 mm long, acute with few glandular teeth. Cymes 5-6 cm across, peduncled. Flowers 5 mm long, sessile; calyx 1.5 mm long, lobes obtuse;

corolla-tube densely villous within; style 4 mm long. Capsule 2.5 x 2.5 mm; mericarps compressed, glabrous.

Flowering & Fruiting: November – March.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

LASIANTHUS W. Jack.

1.	Calyx limb and teeth glabrous	*L. blumeanus*
1.	Calyx limb and teeth hairy	3
2.	Leaves and branchlets glabrous	*L. acuminatus*
2.	Leaves and branchlets more or less pubescent	*L. venulosus*

538. Lasianthus acuminatus Wight, Calcutta J. Nat. Hist. 6: 511. 1846; Hook. f., Fl. Brit. India 3: 185. 1880, p.p.; Gamble, Fl. Pres. Madras 647 (456). 1921; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 12.1987. *Lasianthus coffeoides* Fyson, Bull. Misc. Inform. Kew 1914: 185. 1914 & Gamble, Fl. Pres. Madras 647 (456). 1921; Fyson, Fl. South Indian Hill St. 3: t. 369. 1920. **(PLATE 58: 509)**

Common names: Moottumaram, Peenari (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Large shrubs. Leaves to 9 x 4 cm, elliptic, oblong, apiculate, glabrous; nerves 4 pairs, prominent; nervules closely parallel; petiole 5-7 mm long; stipule triangular, acute, glabrous. Flowers 1-3 together, sessile; calyx lobes acute, triangular, villous; corolla 8 mm long, tube slender, lobes ovate, obtuse, densely villous. Drupe 5 x 5 mm, globose, glabrous.

Flowering & Fruiting: May - November.

Notes: Found in outskirts and inside the sholas ± 2100 m, common in Sispara.

PSU & NKK, Kodanad, 22.03.1994, 26 (TNFDH); KNS, Nilgiris, 07.02.1963, 18 (FRC).

539. Lasianthus blumeanus Wight, Calcutta J. Nat. Hist. 6: 507. 1846; Hook. f., Fl. Brit. India 3: 184. 1880; Gamble, Fl. Pres. Madras 646 (456). 1921; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 12.1987. **(PLATE 59: 510)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Shrubs, branches slender, glabrous. Leaves elliptic-oblong, acuminate, base obtuse, glabrous, to 10 x 4 cm, transverse nervules slender, faint. Bracts linear, pubescent, caducous. Calyx lobes lanceolate, 2 mm long; puberulous. Corolla white, glabrous, 2.5 mm long.

Flowering & Fruiting: December - January.

Notes: Found in outskirts and inside the sholas ± 2050 m, common in Ankinda.

540. Lasianthus venulosus (Wight & Arn.) Wight, Ic. t. 1032. 1845; Hook. f., Fl. Brit. India 3: 190. 1880; Gamble, Fl. Pres. Madras 648 (457). 1921; Fyson, Fl. South Indian Hill St. 2: t. 143. 1932; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 13.1987. *Santia venulosa* Wight & Arn., Prodr. 422. 1834. *Litosanthes venulosa* (Wight & Arn.) Deb & Gangop., Candollea 44: 220. 1989. **(PLATE 59: 511)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small trees. Young stem sparsely hirsute. Leaves 6-12 x 2.5-4 cm, elliptic ovate to oblong, acute, acuminate or even apiculate at apex, round to broadly attenuate at base, hirsute on nerves below. Stipules triangular ovate, hirsute. Flowers in short peduncled axillary cymes. Peduncles 0.5-0.8 cm, hirsute. Bracteoles subulate, 0.25 cm long. Calyx tube 0.1-0.15 cm long; lobes 0.2-0.25 cm, hirsute. Corolla white; tube 0.15-0.2 cm long. Ovary 2-celled. Drupe globose, 0.5-0.6 cm diam., purple on ripening.

Flowering & Fruiting: October - March.

Notes: Found in outskirts and inside the sholas ± 1600 m, common in Thaishola.

PSU & NKK, Kodanad, 11.03.1994, 547 & 13.10.1995, 342 (TNFDH); KNS, Longwood, 20.04.1964, 1211 (FRC).

NEANOTIS W. H. Lewis

1. Corolla white; leaf-margin not revolute .... *N. monosperma*
1. Corolla other than white; leaf-margin revolute with age .... *N. indica*

541. Neanotis indica (DC.) Lewis, Ann. Miss. Bot. Gard. 53: 38. 1966, var. **indica;** M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 16.1987. *Putoria indica* DC., Prodr. 4: 577. 1830. *Anotis leschenaultiana* (Wall. ex Wight & Arn.) Hook.f., Fl. Brit. India 3: 72. 1880; Gamble, Fl. Pres. Madras 604 (426). 1921; Fyson,

Fl. South Indian Hill St. 2: t. 139. 1932. *Hedyotis leschenaultiana* Wall. ex Wight & Arn., Prodr. 411. 1834. *Neanotis indica* (DC.) Lewis var. *affinis* (Wall. ex Wight & Arn.) Lewis, Ann. Miss. Bot. Gard. 53: 39. 1966. *Hedyotis affinis* Wall. ex Wight & Arn., Prodr. 411. 1834, nom. illeg. *Anotis leschenaultiana* (Wall. ex Wight & Arn.) Hook.f. var. *affinis* (Wall. ex Wight & Arn.) Hook.f., Fl. Brit. India 3: 72. 1880; Gamble, Fl. Pres. Madras 604 (426). 1921. **(PLATE 59:512)**

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Diffuse pubescent herbs, rooting at lower nodes. Leaves ovate, acute or shortly acuminate, base obtuse or acute, strigose on both sides, to 4 x 2.5 cm; stipules villous, lobes subulate. Flowers in terminal and axillary tomentose cymes. Calyx lobes ovate-lanceolate. Corolla pale pink, tomentose, funnel shaped, 3 mm long. Stigma 2-lobed.

Flowering & Fruiting: November - December.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 06.02.1991, L b 1 (Cairn Hills); PSU & NKK, Kodanad, 02.03.1994, 10 & 02.09.1994, 497 (TNFDH).

542. Neanotis monosperma (Wall. ex Wight & Arn.) Lewis, Ann. Miss. Bot. Gard. 53: 39. 1966; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 16.1987. *Hedyotis monosperma* Wall. ex Wight & Arn., Prodr. 410. 1834. *Anotis monosperma* (Wall. ex Wight & Arn.) Hook. f., Fl. Brit. India 3: 75. 1880; Gamble, Fl. Pres. Madras 605 (427). 1921; Fyson, Fl. South Indian Hill St. 3: t. 359. 1920. **(PLATE 59: 513)**

Distribution: Peninsular India. *Habitat*: Shola forests.

Prostrate, sparsely strigose herbs; internodes to 4.5(6) cm. Leaves opposite, ovate, to 2.5 x 1.7 cm, base truncate to attenuate, apex acute; petiole to 1.5 cm; stipules 3 mm. Cymes corymbose, lax, 3 x 1.5 cm; peduncles of 1 order to 2 cm; those of 2nd order to 0.5 cm; pedicel to 1.5 cm. Calyx-lobes 4, lanceolate, margin strigose. Corolla white, 3 mm wide; tube 2 mm; lobes 4, strigose at apex. Stamens 4. Capsules ca 10 per cluster, (sub)globose, 2 mm wide, glabrous, dehiscence septicidal; seeds 2 or 3 per cell.

Flowering & Fruiting: December - March.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Mukurthi.

PSU & NKK, Pykara, 06.02.1991, a 18 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 483 & 28.08.1995, 301 (TNFDH); KNS, Bandy shola, 11.05.1963, 553 (FRC).

OLDENLANDIA L.

543. Oldenlandia auricularia (L.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(4): 25. 1891; Gamble, Fl. Pres. Madras 597 (421). 1921. *Hedyotis auricularia* L., Sp. Pl. 101. 1753; Hook. f., Fl. Brit. India 3: 58. 1880; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 6.1987; Dutta & Deb, Taxonomic Revision Hedyotis 99. 2004. *Exallage auricularia* (L.) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 48: 142. 1952. **(PLATE 59: 514)**

Common names: Erachiketti (M).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Diffuse to trailing herbs; stem 4-angled, bluish, villous when young. Leaves 2-7 x 1-2.5 cm, elliptic-ovate or elliptic-lanceolate, base rounded or cuneate, apex shortly acuminate, lateral nerves 4 or 5 pairs, glabrous; stipules broadly ovate, pectinate on margins. Flowers fascicled at axils; pedicels ca 1 mm long. Calyx tube ca 1 mm long, 4-lobed. Corolla white, campanulate; tube ca 1 mm long; lobes 4, reflexed, hairy at throat. Stamens 4, included. Capsule ca 2 mm across, globose, pubescent, indehiscent. Seeds many, black, 3-angled.

Flowering & Fruiting: October - December.

Utility: Used in Ayurveda medicine.

Notes: Found in open areas and waste lands ± 2100 m, common in Ankinda.

OPHIORRHIZA L.

544. Ophiorrhiza brunonis Wight & Arn., Prodr. 404. 1834, var. **brunonis**; Hook.f., Fl. Brit. India 3: 79. 1880; Gamble, Fl. Pres. Madras 608 (428). 1921; Fyson, Fl. South Indian Hill St. 3: t. 360. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 18.1987. *Ophiorrhiza brunonis* Wight & Arn. var. *johnsonii* Hook. f., Fl. Brit. India 3: 80. 1880; Deb & Mondal, Bull. Bot. Surv. India 39: 34. 1997. **(PLATE 59: 515)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small subshrubs; branches pubescent. Leaves to 20 x 7 cm, lanceolate, acuminate, glabrous except the nerves; nerves 10-12 pairs, arching; petiole 2-4 cm long, hispid;

stipule 10 mm long, lanceolate, glabrous. Cymes 5-7 cm broad, terminal, corymbose; peduncle 2-6 cm long, hispid. Flowers 15 mm long, densely arranged; bracteoles 13 mm long, filiform, villous; calyx lobes 2 mm long, hairy; corolla tube 8 mm long, hispid, lobes ovate, obtuse; anthers 2.5 mm long, linear. Fruits not seen.

Flowering & Fruiting: February - September.

Notes: Found in moist region of sholas ± 2050 m, common in Sispara.

PSU & NKK, Naduvattam, 01.02.1991, a 35 (Cairn Hills); KNS, Longwood, 08.05.1963, 467 (FRC).

PAVETTA L.

545. Pavetta breviflora DC., Prodr. 4: 491. 1830, var. **breviflora**; Hook. f., Fl. Brit. India 3: 151. 1880 p.p.; Gamble, Fl. Pres. Madras 633 (447). 1921; Fyson, Fl. South Indian Hill St. 3: t. 365. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 19.1987. *Pavetta brevifolia* DC. var. *subcoriacea* Gamble, Fl. Pres. Madras 634 (447). 1921; Sebastine & Vivek., Bull. Bot. Surv. India 9: 174. 1967. **(PLATE 59: 516)**

Common names: Malampichi (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Shrubs. Leaves opposite, 5.5-13.0 x 1.6-5.5 cm, elliptic or elliptic-obovate, acute at apex and base, subcoriaceous, glabrous; domatia few to many on secondary or tertiary nerves; bracts 8-11 x 5-6 mm, broadly triangular, membranous, glabrous. Inflorescence terminal, peduncled, trichotomously branched, corymbose cymes; flowers 40-50. Calyx tube ca 1.0 x 1.8 mm, broader above, glabrous; teeth narrowly triangular or dentate, glabrous. Corolla tube ca 8 x 1.5 mm across, cylindrical, glabrous; lobes oblong, mucronulate at apex, glabrous. Filaments and anthers glabrous. Ovary 0.8 x 1.0 mm, disc ca 0.5 x 1.0 mm; style stout, glabrous; stigma ca 3 mm, fusiform, glabrous. Drupe 6-7 mm across, globose or subglobose, glabrous, 1 seeded; seeds ca 4 mm.

Flowering & Fruiting: March - December.

Notes: Found in the ecotone region of sholas ± 1800 m, common in Thaishola.

PSU & NKK, Kinnakorai, 13.02.1991, a 37 (Cairn Hills); KNS, Longwood, 08.05.1963, 459 (FRC).

PLEIOCRATERIUM Bremek.

546. Pleiocraterium verticillare (Wight & Arn.) Bremek., Meded. Bot. Mus. Herb. Rijks. Univ. Utrecht 56, 440. 1939; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 21.1987. *Hedyotis verticillaris* Wight & Arn., Prodr. 409. 1834; Hook. f., Fl. Brit. India 3: 56. 1880; Dutta & Deb, Taxonomic Revision Hedyotis 40. 2004. *Oldenlandia verticillaris* (Wight & Arn.) O. Ktze., Rev. Gen. Pl. 1: 293. 1891; Gamble, Fl. Pres. Madras 600 (423). 1921. **(PLATE 59: 517)**

Distribution: South India and Sri Lanka. *Habitat*: Grasslands.

Acaulescent herbs, root-stock thick, clothed with dried leaf-bases. Leaves in dense, basal rosettes, sessile, to 24 x 4 cm, lanceolate, many nerved from base. Flowers on axillary scapes; scapes shorter than leaves. Calyx lobes 5, linear, 3 mm long, glabrous. Corolla white, tube c. 3 mm, lobes 4, elliptic-acute, to 3.5 mm long, throat woolly. Stamens 4, exserted; style included, bilobed; stigma dilated.

Flowering & Fruiting: June - March.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Sispara.

PSU & NKK, Porthimund, 13.02.1991, II a 34 (Cairn Hills).

PSYCHOTRIA L.

1. Pyrenes plano-convex, usually dorsally smooth, ventrally flat 2
1. Pyrenes plano-convex, smooth or furrowed on the back .... *P. bisulcata*

2. Branches of inflorescence whorled 3
2. Branches of inflorescence opposite .... *P. sohmeri*

3. Stipules over 1 cm long .... *P. truncata*
3. Stipules less than 1 cm long .... *P. nilgiriensis*

547. Psychotria bisulcata Wight & Arn., Prodr. 434.1834; Hook. f., Fl. Brit. India 3:171.1880; Gamble, Fl. Pres. Madras 641 (452). 1921; Fyson, Fl. South Indian Hill St. 3: t. 368. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 22.1987. **(PLATE 59: 518)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Subshrubs. Leaves to 11 x 4.5 cm, elliptic, abruptly acuminate, cuneate at base, membranous; nerves 7 or 8 pairs, prominent below, reticulate; petiole 1 cm long; stipule 7 mm long, ovate, cuspidate, densely rufous-villous within. Cymes 3-4 cm

across, villous at nodes. Flowers 4 mm long, sessile; calyx 1.5 mm long, truncate, glabrous; corolla tube 2.5 mm long densely villous inside, lobes acute, deflexed; style 1.5 mm long, broaden up. Fruits not seen.

Flowering & Fruiting: March - July.

Notes: Found in undergrowth of sholas ± 1800 m, common in Naduvattam.

KNS, Longwood, 20.04.1964, 1213 (FRC).

548. Psychotria nilgiriensis Deb & Gangop., Taxon 31: 546. 1982, var. **nilgiriensis;** M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 22.1987. *Psychotria congesta* (Wight & Arn.) Hook.f., Fl. Brit. India 3: 162. 1880; Gamble, Fl. Pres. Madras 640 (451). 1921; Fyson, Fl. South Indian Hill St. 3: t. 366. 1920. *Grumilea congesta* Wight & Arn., Prodr. 432. 1834. **(PLATE 60: 519)**

Common names: Pavadakkambu (M); Amachedi (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small shrubs. Leaves to 8 x 4 cm, obovate, obtuse, cuneate at the base, green when dried; nerves 7 or 8 pairs, domatia glandular; petiole 2 cm long, stipule 6 mm long, ovate, acute. Cymes 2 x 2 cm, terminal, congested. Flowers 5 mm long; calyx cupular, lobes obtuse, ciliate; corolla 5 mm long, tube shorter than lobes, villous along a transverse line inside. Fruit 11 x 7 mm, ellipsoidal, glabrous.

Flowering & Fruiting: September - December.

Notes: Found in undergrowth of sholas ± 2050 m, common in Sispara.

PSU & NKK, Naduvattam, 06.02.1991, a 40 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 129 & 20.10.1994, 161 (TNFDH); KNS, Dodabetta, 08.02.1963, 41 (FRC).

549. Psychotria sohmeri Kiehn, Pl. Syst. Evol. 154: 215. 1986. *Psychotria elongata* (Wight) Hook. f., Fl. Brit. India 3: 163. 1880, non Benth. ex Orsted, 1852; Gamble, Fl. Pres. Madras 641 (452). 1921; Fyson, Fl. South Indian Hill St. 3: t. 367. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 22.1987. *Grumilea elongata* Wight, Ic. t. 1036. 1845. *Psychotria fosbergii* Sohmer, Bot. Not. 129: 381. 1977, non Steyermark, 1972; Deb & Gangop., J. Econ. Tax. Bot. Addl. ser. 7, 70. 1989. **(PLATE 60: 520)**

Distribution: South India and Sri Lanka. *Habitat*: Shola forests.

Shrubs. Leaves to 13 x 9 cm, obovate, apex abruptly acuminate, base cuneate, pits prominent in the nerve axils, coriaceous; petiole to 1.5 cm, stipule 1.5 cm, broadly ovate. Panicle terminal, racemiform, to 8 cm, calyx 1 mm, 5-toothed, ciliate; corolla 5 mm, campanulate, tube with a rim of hairs inside; ovary 0.5 mm, style 4 mm, stigma biglobose. Fruit 7 mm across, globose; seeds plano-convex, smooth.

Flowering & Fruiting: April - August.

Notes: Found in undergrowth of sholas ± 1800 m, common in Naduvattam.

550. Psychotria truncata Wall. in Roxb., Fl. Ind. 2: 162.1824; Hook. f., Fl. Brit. India 3:163.1880; Gamble, Fl. Pres. Madras 640 (451). 1921; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 23.1987. **(PLATE 60: 521)**

Common names: Eswara, Ottamadakke (K).

Distribution: Endemic to Western Ghats. *Habitat*: Shola forests.

Large shrubs. Leaves to 12 x 6 cm, obovate, obtuse, broadly apiculate; nerves 9-11 pairs, 6 mm apart, reticulate towards the margins; petiole 1.5 cm long; stipule 12 mm long. Cymes 4 cm across, long-peduncled; branches whorled. Flowers 8 mm long, sessile; calyx 1 mm long, shallowly lobed, ciliate; corolla lobes 6, oblong, deflexed. Fruits not seen.

Flowering & Fruiting: March - May.

Notes: Found in undergrowth of sholas ± 2050 m, common in Longwood.

RUBIA L.

551. Rubia cordifolia L., Syst. Nat. (ed.12) 3: 229. 1768; Hook. f., Fl. Brit. India 3: 202. 1880; Gamble, Fl. Pres. Madras 655 (462). 1921; Fyson, Fl. South Indian Hill St. 2: t. 144. 1932; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 23.1987. **(PLATE 60: 522)**

Common names: Indian madder (E); Hullu kaddi gidda, Manjishtha, Siragatti (K); Chovvallikkodi, Ellumbarakki, Manjadi, Manjetti, Manjishta, Poont, Poovathu, Sivollikkodi (M); Manjiti, Pacchai muruli, Shevelli (T).

Distribution: Asia, Africa and Europe. *Habitat*: Shola forests.

Scabrous climber, stem 4-angled, articulate. Leaves whorled, 4 in each node, equal or unequal, to 7 x 3 cm, ovate, cordate at base, acuminate at apex, 3-5-ribbed from

base; petiole 2-5 cm long. Flowers 3 mm across; in axillary dichotomous cymes; calyx tube turbinate, lobes 4, minute; corolla lobes ovate, valvate, spreading, white; anthers globose; ovules solitary in each cell, styles 2, stigmas capitate.

Flowering & Fruiting: November - December.

Utility: Used in Ayurveda, Folk, Siddha, Tibetain and Unani medicine. This herb is reported to be useful in treating cough, hepatic and urinary obstructions, jaundice and rheumatism. Roots are reported to be used to treat rheumatoid arthritis, flatulence, diarrhoea, dysentry, leprosy, skin diseases, leucoderma, wounds, ulcers, diabetes, slow healing of broken bones and general debility.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Glenmorgan, 26.01.1991, a 42 (Cairn Hills); MPRR, Ootacamund, 00.10.1929, 21034 (FRC).

SAPROSMA Bl.

552. Saprosma foetens (Wight) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4: 122. 1891; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 24.1987. *Lasianthus foetens* Wight, Calcutta J. Nat. Hist. 6: 517. 1846. *Saprosma ceylanicum* (Gard.) Bedd., For. Man. Bot. 134/5. 1872; Hook. f., Fl. Brit. India 3: 193. 1880; Gamble, Fl. Pres. Madras 649 (458). 1921. *Dysodidendron ceylanica* Gard., Calcutta J. Nat. Hist. 7: 2. 1847. *Serissa wightii* Bedd., Ic. t. 15. 1868-1874. **(PLATE 60: 523)**

Common names: Peenari, Theenari, Theetanari (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Small trees; branchlets white. Leaves to 6 x 2.5 cm, elliptic, acute, cuspidate, dark when dried; petiole 5-8 mm long. Flowers 1-3 together on short cymes, axillary; peduncle and branched slender; calyx 4 mm long, teeth 4, short; corolla tube glabrous inside, lobes 8 x 8 mm, triangular, spreading, dull white. Fruits not seen.

Flowering & Fruiting: Throughout the year.

Notes: Found in undergrowth of shola forests ± 2100 m, common in Ankinda.

SPERMACOCE L.

1. Diffuse herbs; flowers less than 15 per whorl; calyx-lobes spreading; corolla pink to purple, tube villous within .... *S. hispida*
1. Erect herbs; flowers more than 40 per whorl; calyx-lobes erect; corolla white, tube glabrous within .... *S. ocymoides*

553. Spermacoce hispida L., Sp. Pl. 102. 1753; Sivar. & R.V. Nair, Taxon 35: 366. 1986; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 24.1987. *Borreria hispida* (L.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4: 144. 1891, non Spruce ex K. Schum. 1888; Gamble, Fl. Pres. Madras 654 (461). 1921. *Borreria articularis* (L.f.) F. N. Will. var. *hispida* (L.) Sivar. & Manilal, New Botanist 2: 88. 1975. **(PLATE 60: 524)**

Common names: Kudalchurukki, Natthachoori, Tharthavel (M); Nattaichuri, Nuttichoori (T).

Distribution: Peninsular India. *Habitat*: Shola forests.

Herbs. Stem bluish, hispid. Leaves 1-2 x 0.8-1.5 cm, oblong-elliptic to obovate, acute at apex, attenuate at base, hispid on both sides. Stipules sheathing. Flowers in axillary verticillate cymes. Calyx tube 0.15-0.2 cm long, ovoid, hispid without; lobes 4, obovate. Corolla pinkish white; tube slender, 0.5-0.6 cm long, hairy at throat; lobes 4. Capsule subglobose, 0.2-0.25 cm diam., hispid without. Seeds 2, 0.1-0.15 cm long, grooved; septum detaching from coccus.

Flowering & Fruiting: May - August.

Utility: Used in Ayurveda, Folk and Siddha medicine. Extract of whole plant given in haemorrhoids, dyspepsia, colic, flatulence, general debility and gallstones. Seeds are demulcent, used in diarrhoea and dysentery.

Notes: Found in all types of forests, open areas and disturbed forests ± 1900 m, common in Porthimund.

PSU & NKK, Kodanad, 20.10.1995, 351 (TNFDH).

554. Spermacoce ocymoides Burm.f., Fl. Ind. 34 & 13. f.1. 1768; Hook. f., Fl. Brit. India 3: 200. 1881; Fyson, Fl. South Indian Hill St. 3: t. 370. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 24.1987. *Borreria ocymoides* (Burm.f.) DC., Prodr. 4: 544. 1830; Gamble, Fl. Pres. Madras 654 (461). 1921.

Borreria ocymoides var. *thekkumalensis* Sivar. & Joseph, New Botanist 6:133. 1979. **(PLATE 60: 525)**

Common names: Tharakeera (M).

Distribution: Indo-Malesia and Tropical Africa. *Habitat*: Shola forests.

Pubescent, erect herbs. Leaves decussate, elliptic-oblong, to 3.5 x 1.5 cm, sparsely scabrous, nerves 3 or 4 pairs, base cuneate to attenuate, apex acute, (sub)sessile; stipules 1 x 0.8 cm. Flowers 40-50 per node. Calyx truncate, strigose without; lobes 4, unequal, linear-lanceolate, 2 short and 2 long. Corolla white, 2 mm wide; tube 2 mm, glabrous within; lobes 4. Stamens 4. Capsule truncate, 1.5 x 1 mm, dehiscing transversely.

Flowering & Fruiting: November - December.

Notes: Found in all types of forests, open areas and disturbed forests ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 31.08.1994, 154 & 13.10.1995, 349 & 30.11.1995, 597 (TNFDH); MPRR, Ootacamund, 12.10.1929, 21035 (FRC).

WENDLANDIA Bart & DC.

555. Wendlandia thyrsoidea (Schult.) Steud., Nomencl. Bot. (ed. 2) 2: 786. 1841; Fyson, Fl. South Indian Hill St. 3: t. 355. 1920; M. S. Swaminathan in Henry et al., Fl. Tamil Nadu 2: 27.1987. *Canthium thyrsoideum* Schult. in Roem. & Schult., Syst. Veg. 6: 207. 1820. *Wendlandia notoniana* Wall. ex Wight & Arn., Prodr. 403. 1834; Hook. f., Fl. Brit. India 3: 40. 1880; Gamble, Fl. Pres. Madras 588 (415). 1921. **(PLATE 60: 526)**

Common names: Mallangi, Thinthulu (K); Kuruni, Palkuttimaram, Pekanarakam, Puvu, Vellathalachedi (M); Kadamban, Velleithalachedi (T).

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola forests.

Trees, to 8 m high, bark orange-brown, fibrous; branchlets terete to angular, tomentose. Leaves simple, ternate whorled; stipule interpetiolar, 6 mm long, ovate, obtuse, bifid, often recurved, tomentose; petiole 4-10 mm, stout, pubescent; lamina 4-15 x 1.5-7 cm, elliptic, elliptic-lanceolate or elliptic-obovate, base cuneate or attenuate, apex acute or acuminate, margin entire, tomentose beneath, glabrous above on ageing, chartaceous; lateral nerves 5-12 pairs, pinnate, prominent beneath; intercostae reticulate, slender. Flowers bisexual, pale yellow, fragrant, 6 mm long, in dense

terminal panicles; peduncle densely pubescent; bracts and bracteoles lanceolate; calyx subglobose, pubescent, lobes 5, short, valvate; corolla tube elongate, slender 2.5 mm, funnel shaped, sparsely hairy within, lobes 5, imbricate; stamens 5, exserted; anthers oblong, subsessile; ovary depressed globose, 2-celled, inferior, ovules many on globose placenta; style filiform; stigma 2 fid. Fruit a capsule, globose, 2 valved; seeds small; testa membranous.

Flowering & Fruiting: December - April.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Sispara.

PSU & NKK, Naduvattam, 02.02.1991, a 43 (Cairn Hills); KNS, Kodanad, 07.05.1963, 437 (FRC).

90. RUTACEAE

1. Plants armed straggling shrubs **2**
1. Plants unarmed trees **3**

2. Leaves pinnately 5-7 foliolate .... ***Zanthoxylum***
2. Leaves digitately 3-foliolate .... ***Toddalia***

3. Leaves 1-foliolate .... ***Acronychia***
3. Leaves 3-foliolate .... ***Melicope***

ACRONYCHIA J. R. & G. Forst.

556. Acronychia pedunculata (L.) Miq., Fl. Ind. Bat. Suppl. 532. 1861; Fyson, Fl. South Indian Hill. St. 3: t. 302. 1920; E. Vajravelu in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 57. 1983; K.N. Nair & M.P. Nayar in Hajra et al., Fl. India 4: 392.1997. *Jambolifera pedunculata* L., Sp. Pl. 349. 1753. *Acronychia laurifolia* Blume, Cat. Gew. Buitenz. 63. 1823; Hook. f., Fl. Brit. India 1: 498. 1875; Gamble, Fl. Pres. Madras 152 (108). 1915. *Acronychia barberi* Gamble, Bull. Misc. Inform. Kew 1915: 345. 1915 & Gamble, Fl. Pres. Madras 152 (108). 1915. **(PLATE 60: 527)**

Common names: Chattuva Rungia, Sattuka, Sone mavu (K); Chakkimaram, Mavaranchi, Mavuringi, Muttanari, Orilatheeppettimaram, Verukutheeni, Vettukanala, Vidukanali (M); Muttanari, Vidukanalei (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Evergreen trees; branchlets stout, terete, glabrous. Leaves unifoliolate, opposite, decussate, estipulate; rachis 10-30 mm long, slender, glabrous, grooved above; lamina

4.3-15 x 1.8-7.5 cm, obovate, obovate-oblong or oblanceolate, base acute or cuneate, apex obtusely acuminate, margin entire, glabrous, chartaceous. Flowers bisexual, yellowish-white; in trichotomous, corymbose, axillary cymes; peduncle slender 6-12 cm long. Sepals 4, lobes ovate, connate, margin ciliate. Petals 4, free, oblong, densely hairy within. Stamens 8, 2-seriate; filaments unequal, densely reflexed hairy; disc 8-angled, minutely pubescent. Ovary superior, conical, partly immersed in the disc, 4-angled densely silky outside, 4-celled, ovules 2 in each cell; style stout; stigma 4-grooved. Fruit a berry, subglobose, pale-brown, obscurely lobed; seeds black.

Flowering & Fruiting: March - November.

Utility: Used in Folk medicine. Leaves yield an essential oil and tender ones are used as condiment.

Notes: It is not a typical shola species, commonly seen in evergreen forests ± 1800 m, frequent in Naduvattam.

PSU & NKK, Kodanad, 02.09.1994, 153 (TNFDH); KNS, Kodanad, 07.05.1963, 445 (FRC).

MELICOPE J. R. & G. Forst.

557. Melicope lunu-ankenda (Gaertn.) Hartley, Sandakania 4: 61. 1994; K.N. Nair & M.P. Nayar in Hajra et al., Fl. India 4: 369.1997. *Fagara lunu-ankenda* Gaertn., Fruct. Sem. Pl. 334, t. 68. f. 9. 1778. *Evodia lunu-ankenda* (Gaertn.) Merr., Philipp. J. Sci. 7:378.1912; Gamble, Fl. Pres. Madras 148 (105). 1915; Fyson, Fl. South Indian Hill. St. 3: t. 301.1920; E. Vajravelu in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 60. 1983. *Zanthoxylum roxburghianum* Cham., Linnaea 5: 58. 1830. *Euodia roxburghiana* (Cham.) Benth., Fl. Hongk. 59. 1861; Hook. f., Fl. Brit. India 1: 487. 1875. *Euodia lunu-ankenda* (Gaertn.) Merr. var. *tirunelvelica* Henry & Chandrab., Bull. Bot. Surv. India 15: 144. 1973. **(PLATE 61: 528, 528 a)**

Common names: Hole thornokki (K); Kambili, Kanala, Kaneli, Nasakam (M); Kambili maram (T).

Distribution: Indo-Malesia. *Habitat*: Shola forests.

Deciduous trees; branchlets opposite, minutely pubescent. Leaves trifoliate, opposite, estpulate; rachis 40-80 mm long, stout, pubescent, slightly grooved above; leaflets 3-19.5 x 3-8 cm, elliptic, elliptic-oblanceolate or lanceolate grading to obovate, base acute or cuneate, apex acute or acuminate, margin entire, glabrous, membranous.

Flowers unisexual, white or greenish-yellow, in axillary paniculate cymes, 2-3 mm across. Male flowers: ca. 3 mm long. Sepals 4, connate at base; ovate-orbicular. Petals 4, 2-3 mm long, white, glabrous; stamens 4, inserted at the base of the disc, slightly longer than petals; filaments subulate. Disc annular, thick, 4 or more lobed, densely pubescent. Pistillode of 4 rudimentary carpels. Female flowers: sepals and petals as in male flowers. Staminodes 4, inserted at the base of the disc. Ovary superior, subglobose, pubescent abaxially, 4-lobed, 4-celled; ovules 2 in each cell; style short; stigma capitate, 4-grooved. Fruit a capsule, of 4 cocci, each 5-6 mm long, ovoid, brown; seeds oblong, black.

Flowering & Fruiting: May - July.

Utility: Used in Ayurveda and Folk medicine. Leaves are used as as condiment, and wood for boxes, crates, packing cases, match boxes and splints.

Propagation: These seeds are viable for a month. The dark green coloured seeds are soaked in water for a night. Then seeds are broadcasted in the mother bed. Germination percentage is of about 50%.

Notes: Found in outskirts and insides of shola forests ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 08.02.1991, c 1 (Cairn Hills); PSU & NKK, Kodanad, 10.05.1994, 49 & 21.11.1995, 328 (TNFDH).

TODDALIA A. Juss.

558. Toddalia asiatica (L.) Lam., Tabl. Encycl. 2: 116. 1797; Gamble, Fl. Pres. Madras 150(107). 1915; E. Vajravelu in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 62. 1983; K.N. Nair & M.P. Nayar in Hajra et al., Fl. India 4: 403.1997. *Paullinia asiatica* L., Sp. Pl. 365. 1753. *Toddalia aculeata* (Smith) Pers., Syn. Pl. 1: 249. 1805; Hook. f., Fl. Brit. India 1: 497. 1875; Fyson, Fl. South Indian Hill St. 2: t. 57. 1932. *Toddalia floribunda* Wall., Pl. Asiat. Rar. 3: 17, t. 232. 1832. *Toddalia asiatica* (L.) Lam. var. *floribunda* (Wall.) Kurz, J. Asiat. Soc. Bengal pt. 2, Nat. Hist. 44: 130. 1875; Gamble, Fl. Pres. Madras 151(107). 1915. *Toddalia asiatica* (L.) Lam., Illustr. 2: 116. 1797, var. *obtusifolia* Gamble, Fl. Pres. Madras 151 (107). 1915. *Toddalia asiatica* (L.) Lam. var. *gracilis* Gamble, Fl. Pres. Madras 151 (107). 1915. **(PLATE 61: 529)**

Common names: Forest pepper, Lopez root (E); Kadu menasu, Kadu nimbae, Mullamastige (K); Kanthamkolunthu, Kanthammullu, Kakkathodali, Karamullu, Melakkaranam, Mulakuthali (M); Milakaranai, Kattu milagu, Milagucharanai (T).

Distribution: Indo-Malesia and Africa. *Habitat*: Shola forests.

Stragglers, the stem scrambling by the sharp, recurved prickles. Leaves trifoliolate; leaflets sessile, 3-6 x 1.5-2.5 cm, ovate to oblong-lanceolate, base acute, margins shallowly crenulate, apex obtuse or acute, thin-coriaceous; petiole to 2.5 cm, often prickly beneath. Panicles axillary, to 5 cm long. Flowers ca 4 mm across. Sepals small, deltoid. Petals ca 3 x 1.5 cm, oblong, cream coloured, glandular. Stamens ca 3 mm long. Ovary in the pistillate flowers on a short gynophore. Fruit ca 5 mm across, subglobose, apiculate, glandular, orange colour when ripe. Seeds 3 or 4, subreniform.

Flowering & Fruiting: September - July.

Utility: Used in Ayurveda, Folk and Siddha. The root bark is aromatic and pungent, and is credited with diaphoretic, stomachic and antipyretic properties. It shows both antipyretic and antiperiodic effect similar to that of the alkaloids of cinchona. The root bark is also used to treat diarrhoea and constitutional debility during convalescence. In Gabon (Africa), the macerated root bark is used as a remedy against gonorrhoea. The root is also used for the treatment of cough and influenza. It is reported to contain a poisonous resin, which produces in guinea pigs abortion in small doses, and paralysis and death in large doses. It indicates the possibility of its usefulness in menorrhoea. The alcoholic extracts of leaves and roots have been found to possess anti bacterial properties. Fruits are used for diabetics.

Notes: Climbing on shola trees ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, c 5 (Cairn Hills); PSU & NKK, Kodanad, 14.11.1994, 3 (TNFDH); KNS, Staircase shola, 23.04.1964, 1260 (FRC).

ZANTHOXYLUM L.

559. Zanthoxylum tetraspermum Wight & Arn., Prodr. 148. 1834; Hook. f., Fl. Brit. India 1: 494. 1875; Gamble, Fl. Pres. Madras 150 (107). 1915; Fyson, Fl. South Indian Hill St. 1: 73. 1932; E. Vajravelu in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 63. 1983; K.N. Nair & M.P. Nayar in Hajra et al., Fl. India 4: 389. 1997. *Fagara tetrasperma* (Wight & Arn.) Engl. in Engl. & Prantl, Naturl. Pflanzenfam. 3: 118. 1897. **(PLATE 61: 530)**

Common names: Sheshike, Shettiga (K); Kokkimullu (M).

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Scandent woody climbers, prickles short, recurved. Leaves 5-9-foliolate; leaflets 10 x 5 cm, ovate, acuminate, rounded at base, crenate; nerves to 24 pairs, subparallel, reticulate at margin; petiole prickly. Panicle 5-8 x 3 cm, axillary, hirtus. Flowers 5 mm across, 4-merous; sepals 1 mm long, ovate, acute; petals 3 x 2 mm, ovate, obtuse; stamens 4, anthers cleft at base, with a sessile gland at apex; pistillodes 4, free with subulate tips; style 4, free, recurved. Capsule 8 mm across, 4-lobed.

Flowering & Fruiting: April - December.

Utility: Used in Ayurveda medicine.

Notes: Found in the margins of sholas ± 1800 m, common in Naduvattam.

91. SABIACEAE

MELIOSMA Bl.

1. Leaves simple; ovary glabrous; stone rugose ....***M. simplicifolia*** ssp. ***simplicifolia***
1. Leaves pinnate; ovary pubescent; stone smooth ....***M. pinnata*** ssp. ***barbulata***

560. Meliosma pinnata (Roxb.) Maxim. ssp. **barbulata** (Cufod.) Beus. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 384. 1981; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 86. 1983; S.C. Majumdar in N.P. Singh et al., Fl. India 5: 423. 2000. *Meliosma rhoifolia* Maxim. ssp. *barbulata* Cufod., Oest. Bot. 88. 254. 1939. *Millingtonia arnottiana* Wight, Illustr. 1: t.53. 1840. *Meliosma arnottiana* (Wight) Walp., Rep. 1: 423. 1842; Hook. f., Fl. Brit. India 2: 6. 1876 p.p.; Gamble, Fl. Pres. Madras 256 (183). 1918; Fyson, Fl. South Indian Hill St. 2: t. 71. 1932. *Meliosma pinnata* (Roxb.) Maxim. ssp. *arnottiana* (Wight) Beus., Blumea 19: 499. 1971. *Millingtonia pinnata* Roxb., Fl. Ind. 1: 103. 1820. **(PLATE 61: 531)**

Common names: Honey Sweet Tree (E); Massivala, Hulimukki (K); Kalavi, Thakiri (M); Kusavi, Hulimakai, Thagari (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Trees; branchlets brown villous, prominently lenticellate. Leaves imparipinnate, pinnate, alternate, estipulate; rachis stout, rusty pubescent; leaflets 9-15, opposite or subopposite; petiolule 4-10 mm, slender, rusty tomentose; lamina 3.5-12.5 x 1.5-4 cm, oblong, oblong-lanceolate, elliptic-oblong or elliptic-ovate; base obtuse, round or oblique, apex acuminate or acute, margin entire, glabrous above, rusty tomentose

beneath, coriaceous. Flowers bisexual, yellowish-white in large terminal and axillary tomentose panicles; bracteoles sepaloid. Sepals 5, basally connate, triangular, ciliate. Petals 3+2; inner ones 2-fid; outer 3 suborbicular, unequal; fertile stamens 2; filaments 1.5 mm; staminodes 3, scaly, to 1 mm. Ovary superior, tomentose, 2-celled, ovule 2 in each cell; style terminal, stigma simple. Fruit a drupe, 5-6 mm across, globose.

Flowering & Fruiting: March - June.

Propagation: The seeds are viable for two weeks. Black coloured seeds are collected from healthy trees and soaked in water for 24 hours and depulped. The depulped white seeds are dried and sown in well prepared mother beds. Germination is noticed from 30 to 35 days and is of about 40 %.

Notes: Found in outskirts and insides of shola forests ± 1800 m, common in Naduvattam.

Meliosma simplicifolia (Roxb.) Walp.

1. Leaves membranous, obovate or oblanceolate, glabrous .... ***M. simplicifolia*** ssp. ***simplicifolia***
1. Leaves coriaceous, elliptic-oblong or lanceolate, pubescent .... ***M. simplicifolia*** var. ***pungens***

561. Meliosma simplicifolia (Roxb.) Walp. var. **pungens** (Wall. ex Wight & Arn.) Beus., Blumea 19: 466. 1971; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 86. 1983; S.C. Majumder in N.P. Singh et al., Fl. India 5: 427. 2000. *Millingtonia pungens* Wall. ex Wight & Arn., Edinb. New Phil. J. 15: 178. 1833. *Meliosma pungens* (Wight & Arn.) Walp., Rep. 1: 423. 1842. *Meliosma wightii* Planch. ex Brandis, For. Fl. 116. 1874; Hook. f., Fl. Brit. India 2: 4. 1876; Gamble, Fl. Pres. Madras 256 (182). 1918; Fyson, Fl. South Indian Hill St. 2:t. 70. 1932. **(PLATE 61: 532, 532a & b)**

Common names: Bustad Mango (E); Tode, Metta (K); Cembavu, Kallavi, Tode (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Trees, to 20 m high, bark greyish-brown, smooth; blaze deep pink changes to orange-red; branchlets densely tomentose. Leaves simple, alternate, estipulate; petiole 1.5-5 cm, stout, puberulent, grooved above; lamina 5-30 x 2-10 cm, elliptic-oblong, elliptic-obovate or oblanceolate or sometimes lanceolate; base acute to round, apex acute or acuminate, margin entire or with some distant teeth, usually distinctly pubescent on midrib, sometimes on nerves above, sparsely to moderately pubescent especially on midrib and nerves beneath, usually with domatia, coriaceous; lateral nerves 7-18

pairs, pinnate, ascending, prominent, intercostae reticulate, prominent. Flowers small, bisexual, pale yellow, crowded in dense glomerule, sessile, in lax or dense panicles of 5-55 cm; branches rather coarse, terete to slightly angular, densely short tomentose, the lower primary ones almost always subtended by small leaves; sepals actually 5, and 3 or more sepal like empty bracts, ovate, ciliolate; petals 3+ 2; inner ones ca. 1 mm bifid; lobes divergent, glabrous; outer ones orbicular, 2 mm; stamens 5; fertile stamens 3; filaments to 1 mm; staminodes to 1.5 mm; anthers globose; sterile ones bifid at apex; disc annular; ovary superior, glabrous, to 1 mm, 2-celled, ovules 2 per cell; style 1 mm. Fruit a drupe, 5-6 mm across, globose, purple-black, crustaceous, endocarp globose or subglobose, often rather irregular, with usually lax reticulum; median keel distinct but not very prominent.

Flowering & Fruiting: September - March.

Propagation: As viability is poor immediate sowing is advisable. Dried seeds are sown in mother bed for germination. Mother bed rooting medium consist of red shola soil and sand at the ratio of 1:1. Germination is noticed after 45 days. Germination is about 40 %.

Notes: Found in outskirts and insides of shola forests ± 2100 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, I c 32 (Cairn Hills).

562. Meliosma simplicifolia (Roxb.) Walp. Rep. 1: 423. 1842, ssp. **simplicifolia**: Hook. f., Fl. Brit. India 2: 5. 1876; Gamble, Fl. Pres. Madras 256 (182). 1918; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 86. 1983; S.C. Majumdar in N.P. Singh et al., Fl. India 5: 423. 2000. *Millingtonia simplicifolia* Roxb., Pl. Corom. 3: 50. t. 254. 1820 p.p. **(PLATE 61: 533)**

Common names: Chengoini, Chenthanam, Kallavi, Kolakkatta (M); Cembavu, Kallavi, Tode (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Trees, to 15 m high; bark greyish-yellow, smooth; blaze pink-red; branchlets glabrescent. Leaves simple, alternate, estipulate; petiole 15-50 mm, stout, puberulent, grooved above; lamina 9-40 x 2.5-15 cm, obovate-oblong to obovate, lanceolate, oblanceolate or oblong-lanceolate, base cuneate or acute, apex acute, margin entire, sometimes more or less dentate, glabrous, very rarely sparsely puberulous or pubescent on the midrib above especially in young leaves, sometimes sparsely pubescent beneath,

often with domatia, coriaceous, lateral nerves 8-23 pairs, pinnate, ascending, intercostae reticulate, prominent. Flowers bisexual, subsessile, yellowish-white, solitary or more less crowded in lax panicles of 10-45 cm, branches slender, angular, sparsely to densely pubescent but never tomentose, the lower primary ones nearly always subtended by small to normal leaves; sepals 4 or 5, ciliolate; petals 3+2, yellow; inner petals bifid, lobes more or less divergent, narrow, glabrous, sometimes slightly fimbriate or ciliolate at the very tips; disc small, annular and toothed; ovary superior, glabrous, 2-celled, 2-ovuled; style short. Fruit a drupe, globose, purple-black; endocarp subglobose, usually rather oblique, nearly triangular at ventral view, with more or less prominent rather coarse reticulum; median keel usually very prominent.

Flowering & Fruiting: March - June.

Notes: Wood is light and is used for pencils. Found in shola forests insides ± 2000 m,. common in Kotagiri.

92. SALICACEAE

SALIX L.

563. Salix tetrasperma Roxb., Pl. Corom. t. 97. 1798; Hook. f., Fl. Brit. India 5: 626. 1888; Gamble, Fl. Pres. Madras 1390 (973). 1928; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 258.1987. **(PLATE 62: 534)**

Common names: Neeruvanji, Niranji (K); Attupala, Puzhappanji, Vanchi, Vanchimaram (M); Attupalai, Vanji, Neervanji, Nir nochi (T).

Distribution: Indo-Malesia and South China. *Habitat*: Marshy areas.

Deciduous, dioecious trees, to 25 m high, bark 10-12 thick, pale brown, rough, vertically fissured; blaze red; young branches silky pubescent. Leaves simple, alternate; stipules lateral, ovate, causducous; petiole 10-25 mm, slender, glabrous, grooved above; lamina 6-15 x 2-5 cm, ovate, lanceolate or ovate-lanceolate; base acute or rounded; apex acuminate; margin serrate, glabrous and shining above, glaucous beneath, coriaceous; lateral nerves 10-18 pairs, pinnate, close, prominent, intercostae reticulate, faint. Flowers unisexual, in axillary catkins, to 6 cm long, minutely silky villous; male yellowish; female greenish; bracts ovate, 2 x 2 mm, densely woolly; perianth absent; stamens 5-12, unequal, free, with 2 glands at the base; anthers basifixed; disc yellow, ovary stalked, superior, 1-celled, ovoid, 4-6 ovuled; stigma 2, branched again. Fruit a capsule, 4 mm, 2-4 valved; seeds 1-4, oblong, with long deciduous hairs.

Flowering & Fruiting: July - December.

Utility: Used in Ayurveda, Folk, Siddha and Unani medicine.

Notes: Found along the perennial streams of sholas ± 2100 m, common in Pykara.

PSU & NKK, Pykara, 19.02.1991, a 49 (Cairn Hills).

93. SANTALACEAE

1. Procumbent herbs; flowers solitary, bisexual, creamy; fruit a nut .... *Thesium*
1. Shrubs; flowers clustered, unisexual, 3-merous, greenish-yellow; fruit a drupe .... *Osyris*

OSYRIS L.

564. Osyris quadripartita Salzm. ex Decne., Ann. Sci. Nat. Bot. ser. 2, 6: 65. 1836; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 219.1987. *Osyris wightiana* Wall. ex Wight, Ic. t. 1853. 1852. *Osyris arborea* Wall. ex A. DC. in DC., Prodr. 14: 633. 1857; Hook. f., Fl. Brit. India 5: 232. 1886; Gamble, Fl. Pres. Madras 1262 (883). 1925; Fyson, Fl. South Indian Hill St. 3: t. 489. 1920. **(PLATE 62: 535)**

Common names: Nepal tree (E); Natadike (K); Pulluruvi, Vellachandanam (M); Karipakku-chedi (T).

Distribution: Sri Lanka, Peninsular India to Subtropical Himalaya on the hills. *Habitat*: Grasslands.

Shrubs with angular branches. Leaves alternate, to 4 x 2 cm, elliptic, mucronate, pubescent below; petiole 3 mm. Cymes axillary; flowers polygamous, 3-merous; male flowers- tepals basally connate, 2 mm, ovate, hairy inside, spreading; stamens exserted; female flowers 3 mm across.

Flowering & Fruiting: January - April.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Mukurthi.

PSU & NKK, Dodabetta, 11.02.1991, III a 2 & Kalhatty, 27.03.1991, a 1 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 248 & 02.09.1994, 157 (TNFDH).

THESIUM L.

565. Thesium wightianum Wall. ex Hook.f., Fl. Brit. India 5: 230. 1886; Gamble, Fl. Pres. Madras 1260 (882). 1925; Fyson, Fl. South Indian Hill St. 3: t. 488. 1920; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 219.1987. **(PLATE 62: 536)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Well-branched perennial herb from a woody base; branchlets angular, radiating, procumbent, to 20 (35) cm. Leaves alternate, linear, to 2.5 x 0.2 cm, decurrent. Flower bisexual, solitary, axillary; bracts and bracteoles linear, 3 mm. Perianth cream coloured, adnate to ovary and produced above; lobes 5, ovate, 1 mm, with a tuft of hairs above. Stamens 5, attached to base of tube, subsessile, included. Ovary inferior; ovules 3, pendulous from a central column; stigma subsessile, capitate. Nutlets ovoid, 6 mm, 10-ribbed, hard, surmounted by incurved perianth-lobes; seed 2.5 mm.

Flowering & Fruiting: April - June.

Notes: Found in rocky areas in grasslands ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, a 5 (Cairn Hills).

94. SAPINDACEAE

1. Erect large shrubs; leaves simple; capsule winged .... ***Dodonaea***
1. Stragglers; leaves 3-foliolate; berry globose, red .... ***Allophylus***

ALLOPHYLUS L.

566. Allophylus concanicus Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 20: 230. 1890; Gamble, Fl. Pres. Madras 246 (176). 1918; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 83. 1983; P.C. Pant in N.P. Singh et al., Fl. India 5: 348. 2000. *Allophylus concanicus* Radlk. var. *lanceolatus* Gamble, Fl. Pres. Madras 246 (176). 1918. **(PLATE 62: 537)**

Common names: Muruelagida (K).

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Stragglers, branchlets brownish, lenticellate. Leaflets to 13 x 6 cm, ovate, acuminate, cuspidate; 6-nerved, serrate towards the apex, black above when dried; midrib pubescent; domatia hairy. Raceme branched, hispid. Flowers solitary or paired, 2

mm across; pedicel 1 mm long; sepals orbicular, ciliate; petals 5 mm across, densely white hairy within; filaments hairy, reddish, connective broad; disk lobes 4, globular.

Flowering & Fruiting: December - April.

Notes: Found in the ecotone region of sholas ± 1700 m, common in Thaishola.

PSU & NKK, Kodanad, 10.10.1994, 198 (TNFDH).

DODONAEA P. Miller

567. Dodonaea viscosa (L.) Jacq., Enum. Syst. Pl. 19. 1760; Hook. f., Fl. Brit. India 1: 697. 1875; Gamble, Fl. Pres. Madras 253 (181). 1918; Fyson, Fl. South Indian Hill St. 2: t. 68. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 84. 1983, var. **angustifolia** (L. f.) Benth., Fl. Austral. 1: 476. 1863; P.C. Pant in N.P. Singh et al., Fl. India 5: 361. 2000. *Dodonaea angustifolia* L. f., Suppl. Pl. 218. 1781. *Ptelea viscosa* L., Sp. Pl. 118. 1753. **(PLATE 62: 538)**

Common names: Hopseed bush, Jamaica Switch sorrel (E); Andhara gida, Bandare, Gonavari (K); Aattotta, Vrali, Krali, Unnatharuvi (M); Virali, Velari (T).

Distribution: Pantropical. *Habitat*: Shola border.

Shrubs to small sized trees, up to 4 m tall; branches terete, often angled; young parts scurfy puberulous. Leaves alternate, 1-8 x 0.2-1.5 cm, oblanceolate-obovate or broadly elliptic, subacute or shortly apiculate or sometimes notched, abruptly tapering towards the basal end, viscid, with shining yellowish resinous exudation. Inflorescence panicled cymes, up to 7 cm long, lateral nerves up to 35, looping. Flowers greenish yellow. Sepals oblong. Anthers oblong-linear. Capsules membranous, compressed, up to 1.5 cm long, notched at apex and base, 2-3-winged, 1-2-seeded; seeds black.

Flowering & Fruiting: January - May.

Utility: Used in Ayurveda, Folk and Siddha medicine. Bark and leaves yeild tannin, used in manufacture of light coloured leathers.

Notes: Found along the margins of sholas ± 2100 m, common in Pykara.

PSU & NKK, Glenmorgan, 26.01.1991, c 29 (Cairn Hills); PSU & NKK, Kodanad, 22.03.1994, 27 & 20.10.1994, 287 (TNFDH).

95. SAPOTACEAE

1. Calyx segments 5-6; stamens 5 .... *Xantolis*
1. Calyx segments 4-8; stamens more than 5 .... *Isonandra*

ISONANDRA Wight

568. Isonandra perrottetiana A. DC. in DC., Prodr. 8: 188. 1844; Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761 (535). 1921; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 63.1987. *Isonandra candolleana* Wight, Ic. t. 1220. 1850; Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761 (535). 1921; Fyson, Fl. South Indian Hill St. 3: t. 412. 1920. **(PLATE 62: 539)**

Common names: Karimpala (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 10 m high; bark smooth, brown; exudation milky. Leaves simple, alternate, spiral, estipulate; petiole 3-7 mm, stout, grooved above, glabrous; lamina 5-11 x 2.5-4 cm, elliptic, oblanceolate or obovate-oblong, base acute, apex obtuse, acuminate or obtusely acute, margin entire, recurved, glabrous, coriaceous; lateral nerves 10-12 pairs, pinnate, prominent, intercostae subscalariform. Flowers bisexual, dull-white, in sessile densely packed, axillary fascicles; pedicels 2 mm long, tomentose; bracts and bracteoles obtuse; sepals 2+2, broadly ovate, very unequal, the exterior much larger, hairy and ciliate; corolla deeply 4-partite; lobes obovate-oblong, emarginate, longer than the tube; stamens 8, subequal, attached at the base of the corolla, 1-seriate; anthers oblong-lanceolate, black-hairy at tip; staminodes absent; ovary superior, densely hairy, 4-celled; style subulate. Fruit a berry, 17 x 10 mm, obovoid, cuspidate, glabrous.

Flowering & Fruiting: March - April.

Notes: Found in the borders of sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Kinnakorai, 19.02.1991, b 34 (Cairn Hills); KNS, Longwood, 08.05.1963, 496 (FRC).

XANTOLIS L.

569. Xantolis tomentosa (Roxb.) Rafin., Sylv. Tellur, 35. 1838; P. Bhargavan in Henry et al., Fl. Tamil Nadu 2: 64.1987. *Sideroxylon tomentosum* Roxb., Pl. Corom.1: 28. t. 28. 1795; Hook. f., Fl. Brit. India 3: 538. 1882; Gamble, Fl.

Pres. Madras 759 (534). 1921; Fyson, Fl. South Indian Hill St. 2: t. 183. 1932. *Sapota elengioides* A. DC., Prodr. 8: 176. 1844. *Achras elengioides* (A. DC.) Bedd., Fl. Sylv. t. 235. 1872. *Sideroxylon tomentosum* Roxb. var. *elengioides* (A.DC.) Gamble, Fl. Pres. Madras 759 (534). 1923. *Xantolis tomentosa* (Roxb.) Rafin. var. *elengioides* (A.DC.) Vajr., Biol. Mem. 22: 86. 1977. **(PLATE 62: 540)**

Common names: Hudigullu, Kampale, Gundalae (K); Karimkara (M).

Distribution: India, Sri Lanka and Indo-China. *Habitat*: Shola forests.

Trees; exudation milky; young parts ferruginous pubescent, old branches with stout thorns. Leaves simple, alternate, lamina 4-8 x 1.5-3.5 cm, elliptic, elliptic-obovate or obovate; base attenuate, apex obtusely acute, margin entire, woolly beneath when young, glabrous when mature, coriaceous. Flowers bisexual, white or yellowish white, fragrant, fascicled at leafless nodes; pedicel 4-5 mm, tomentose. Sepals 3+3, ovate, acute, hairy, inner smaller. Corolla lobes 5-6, 10 mm long, campanulate, tube globose, throat densely hairy, lobes lanceolate. Stamens 6, filaments linear, anthers ovate or lanceolate, extrorse, filaments hairy at base; staminodes 4, filiform, hairy with broad base. Ovary 5-celled, superior, densely hairy, conical, ovules on axile placentae; style 10 mm long, cylindric; stigma small. Fruit a berry, 2.5 x 1.5 cm, ovoid, green, apiculate; seeds ellipsoid, shining, brown.

Flowering & Fruiting: August - December.

Utility: Used in Ayurveda and Folk medicine.

Propagation: Seeds are viable for three months. The fleshy pods are opened manually and the seeds are dried in the sunlight. The dried seeds are soaked and broadcasted over the well prepared mother beds. The mother bed consists of rooting medium of standard mixture of red soil and sand. Seeds showed 50 percentage of germination.

Notes: Found mostly in interiar parts of sholas ± 2050 m, common in Pykara.

KNS, Nilgiris, 11.05.1963, 531(FRC).

96. SCROPHULARIACEAE

1. All leaves alternate; plant densely woolly-tomentose. **2**
1. All leaves opposite or verticellate or at least lower ones opposite **3**

2. Corolla subrotate; fruiting calyx longer than capsule; flowers yellow .... ***Verbascum***
2. Corolla bilabiate; fruiting calyx shorter than capsule; flowers rose .... ***Pedicularis***

3. Stamens 2 4
3. Stamens 4 6

4. Staminodes absent 5
4. Staminodes 2 .... *Lindernia*

5. Flowers yellow, 2-lipped, saccate, inflated; branchlets succulent .... *Calceolaria*
5. Flowers pinkish, subrotate, neither saccate nor inflated; branchlets not succulent........ *Veronica*

6. Calyx with dorsal wing, in fruits .... *Torenia*
6. Calyx without dorsal wings 7

7. Corolla-tube bent from above the middle .... *Striga*
7. Corolla-tube not bent 8

8. Leaves filiform, hirsute; flowers pink or pinkish-white .... *Parasopubia*
8. Leaves 3-fid or upper ones entire; linear-oblong, coriaceous; flowers yellow .... *Sopubia*

CALCEOLARIA L.

570. Calceolaria mexicana Benth., Pl. Hartw. 47. 1840; Gamble, Fl. Pres. Madras 973 (684). 1924; Fyson, Fl. South Indian Hill St. 3: t. 441. 1920; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 119.1987. **(PLATE 62: 541)**

Common names: Ladies purse (E); Nettipottuchedi (M).

Distribution: Tropical America. *Habitat*: Moist places.

Erect uniformly glandular-hairy, annual herbs. Leaves opposite, glandular-hairy especially on the upper surface, varying much in size and shape; basal parts of leaves simple, variously sinuate, up to 7 x 4 cm; above these are the largest leaves, pinnatifid. Inflorescence of few-flowered cymes in the upper axilis. Flowers lemon-yellow, on slender pedicels 1-2 cm long. Calyx glandular-hairy, 4-lobed, lobes ovate-acute, 7 x 4 mm, serrate, persistent. Corolla very irregular, bilabiate; upper lip small, ascending, saccate; lower lip inflated and slipper-like, 1.6 x 1.2 cm. Stamens 2, enclosed in the upper lip, inserted at the base of the corolla- tube. Ovary conical, 3 x 1 mm, 2-celled; style short, obscurely 2-lobed. Fruit a conical septicidal capsule 1 x 0.6 cm surmounted by the persistent style; seeds minute, numerous.

Flowering & Fruiting: September - December.

Notes: Found in wastelands, roadsides, moist areas etc. ± 2100 m, common in Dodabetta.

PSU & NKK, Hungerford, 22.02.1991, c 34 (Cairn Hills); PSU & NKK, Kodanad, 30.10.1994, 175 (TNFDH); KNS, Bangithapal, 12.05.1963, 645 (FRC).

LINDERNIA All.

571. Lindernia hyssopioides (L.) Haines, Bot. Bihar and Orissa 635. 1922; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 122.1987. *Gratiola hyssopioides* L., Mant. Pl. 2: 174. 1771. *Ilysanthes hyssopioides* (L.) Benth. in DC., Prodr. 10: 419. 1846; Hook. f., Fl. Brit. India 4: 283. 1884; Gamble, Fl. Pres. Madras 961 (675). 1923; Fyson, Fl. South Indian Hill St. 3: t. 445. 1920. **(PLATE 62: 542)**

Distribution: South East Asia, Malesia and China. *Habitat*: Marshy areas.

Slender erect herbs; up to 40 cm tall; stem 4-angled, simple or diffusely branched. Leaves 1-2 x 0.2-0.4 cm, linear-lanceolate, basal ones elliptic-ovate, base cuneate or truncate, apex acute, faintly 3-nerved from base, sessile. Flowers axillary, solitary; bracts linear; pedicels 1-3 cm long, filiform, deflexed in fruit. Calyx deeply 5-lobed almost to the base, 1.5-3.5 mm long, lobes linear-lanceolate, glabrous, tip purplish. Corolla pale lilac or bluish, 6-10 mm long, upper lip 2-lobed at apex, lower lip 6-10 mm across with dark blue blotches at base of lobes. Stamens 2, inserted at about the middle of corolla tube; anthers oblong; staminodes usually 2-fid, obtuse with a linear hairy, basal appendage. Capsule 4-5 mm long, ovoid-ellipsoid, twice as long as the fruiting calyx. Seeds yellow, oblong, longitudinally ridged.

Flowering & Fruiting: March - September.

Utility: Used in Ayurveda and Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

KNS, Avalanche, 26.04.1964, 1329 (FRC).

PARASOPUBIA H.-P. Hofm. & Eb.

572. Parasopubia delphiniifolia (L.) H.-P. Hofm. & Eb. Fisch., Bot. Jahrb. Syst. 125: 357. 2004. *Gerardia delphiniifolia* L., Cent. Pl. 2: 21. 1756. *Sopubia delphiniifolia* (L.) G. Don, Gen., Hist. 4: 560. 1837 "delphinifolia"; Hook. f., Fl. Brit. India 4: 302. 1885; Gamble, Fl. Pres. Madras 970 (682). 1924; Fyson, Fl. South Indian Hill St. 2: t. 199. 1932; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 125.1987. **(PLATE 63: 543)**

Distribution: India and Sri Lanka. *Habitat*: Grasslands.

Herbs. Stem hispid. Leaves 2-3.5 cm long, lobes narrow, filiform, hirsute. Flowers pink or pinkish-white, axillary; pedicels 2-3 cm long, slender; calyx 9 mm long, tube

ribbed, lobes acuminate, scabrid; corolla 2.5 cm long, tube ventricose, lobes subequal, obovate, obtuse; stamens 4, one anther lobe sterile, spurred. Capsule 5 x 3.5 mm, truncate at apex; seeds oblong, pitted.

Flowering & Fruiting: September - October.

Utility: Used in Folk medicine.

Notes: Found in grasslands ± 2000 m, common in Sispara.

PEDICULARIS L.

573. Pedicularis zeylanica Benth., Scroph. Ind. 54.1835; Hook. f., Fl. Brit. India 4: 317. 1884; Gamble, Fl. Pres. Madras 972 (683). 1924; Fyson, Fl. South Indian Hill St. 2: t. 201. 1932; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 125.1987. **(PLATE 63: 544)**

Distribution: Peninsular India and Sri lanka. *Habitat*: Shola border.

Weak stemmed semiparasitic herbs; stems suberect, hispid. Leaves alternate, sessile, to 5 x 2 cm, oblong, pinnately lobed, lobes crenate, hispid. Flowers in terminal racemes, densely arranged, sessile; calyx campanulate, 5-toothed; corolla pink, 2-2.5 cm long, bilipped, upper lip hooded; lower lip equally 3-lobbed, purple, tube broadening above; stamens 4, perfect, anthers narrowing to one end, connate in pairs; style slender, stigma terminal. Capsule 8 x 6 mm, split at one side, glabrous; seeds reticulate.

Flowering & Fruiting: September - December.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Ankinda.

SOPUBIA Buch.-Ham.

574. Sopubia trifida Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 88. 1825; Hook. f., Fl. Brit. India 4: 302. 1884; Gamble, Fl. Pres. Madras 970 (682). 1924; Fyson, Fl. South Indian Hill St. 2: t. 200. 1932; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 125.1987. **(PLATE 63: 545)**

Distribution: Indo-Malesia and China. *Habitat*: Grasslands.

Stout rigid herbs; stems hispid. Leaves 3-fid or upper ones entire; lobes 1-2 cm long, linear-oblong, coriaceous, covered with tubercle based hairs. Flowers axillary or in terminal racemes; pedicels 7 mm long; calyx 3.5 mm long, campanulate, lobes

triangular, glandular; corolla 12 mm across, lobes rotate, subequal; anthers bearded at base. Capsule 3 x 2.5 mm, emarginate at apex; seeds brown.

Flowering & Fruiting: April - May.

Notes: Found in grasslands ± 2050 m, common in Western catchment.

STRIGA Lour.

575. Striga asiatica (L.) O. Ktze., Rev. Gen. Pl. 2: 466. 1981; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 126.1987. *Buchnera asiatica* L., Sp. Pl. 1630. 1753. *Striga lutea* Lour., Fl. Cochinch. 22. 1790; Hook. f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Pres. Madras 968 (680). 1924; Fyson, Fl. South Indian Hill St. 3: t. 447. 1920. **(PLATE 63: 546)**

Common names: Belikasa (K); Kalupullappan (M).

Distribution: South East Asia and Africa. *Habitat*: Shola forests.

Semi-prostrate herbs. Stems to 35 cm high, tubercled hairy. Leaves to 4 x 0.5 cm, lanceolate to oblanceolate, thickly scabrid. Flowers sessile in terminal spike; bracts and bracteoles lanceolate; sepals 1 cm long, oblong, glabrous, united to near the tip, tubercled hairy; corolla 14 mm long, tube slender; upper lip orbicular, entire. Capsule 4 x 3 mm, oblong, glabrous; seeds angular, pitted.

Flowering & Fruiting: July - September.

Utility: Used in Ayurveda, Folk and Siddha medicine.

Notes: Found in open grasslands ± 2000 m, common in Ankinda.

TORENIA L.

576. Torenia travancorica Gamble, Fl. Pres. Madras 957 (671). 1923; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 127.1987. *Torenia asiatica* Hook.f., Fl. Brit. India 4: 277. 1884 p.p., non L. 1753; Fyson, Fl. South Indian Hill St. 3: t. 442. 1920. **(PLATE 63: 547)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Creeping or scandent herbs; stems slender, 4-angled, with 10 cm long internodes. Leaves to 6 x 2 cm, ovate, acuminate, base rounded, thinly hirtus; nerves 5-7 pairs; petiole to 1 cm long. Flowers axillary; pedicels to 2.5 cm long, solitary, glabrous;

calyx 2.2 cm long, tubular, narrowly winged, ciliolulate or glabrous, lobes acute; corolla 3.5 cm long, tube yellow, lobes deep blue, obtuse, spreading; anthers connate in pairs; appendages on the filaments 6 mm long, filiform. Capsule 2 cm long, glabrous; seeds pitted, pale brown.

Flowering & Fruiting: June - January.

Utility: Used in Ayurveda medicine.

Notes: Found in moist rocky slopes of sholas ± 1800 m, common in Naduvattam.

VERBASCUM L.

577. Verbascum thapsus L., Sp. Pl. 177. 1753; Hook. f., Fl. Brit. India 4: 250. 1883; Gamble, Fl. Pres. Madras 945 (663). 1923; Fyson, Fl. South Indian Hill St. 3:t. 440. 1920; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 127.1987. **(PLATE 63: 548)**

Distribution: Native of Europe, Northern Africa and Asia. *Habitat*: Grasslands.

Biennial herbs to 1.5 m tall, with greyish-yellow dense, stellate hairs. Basal and lower stem leaves petiolate; leaf blade oblanceolate-oblong, to 15 x 6 cm, margin crenate; other cauline leaves gradually decreasing in size upward, sessile, oblong to ovate-oblong, base decurrent into wings. Spicate panicle cylindric, to 30 x 2 cm, dense. Flowers usually few fascicled; pedicel short. Calyx ca. 7 mm; lobes lanceolate. Corolla yellow, 1-2 cm in diam. Stamens 5; filaments of anterior 2 stamens glabrous and of posterior 3 pubescent; anther lobes divergent at base. Capsule ovoid, as long as persistent calyx.

Flowering & Fruiting: March - July.

Utility: Used in Homeopathy medicine.

Notes: Found in roadsides and wastelands ± 2000 m, common in Thalakuntha.

PSU & NKK, Korakundha, 22.02.1991, c 41 (Cairn Hills); PSU & NKK, Kodanad, 14.08.1995, 296, 506 (TNFDH).

VERONICA L.

578. Veronica polita Fries, Novit. Fl. Svec. 63. 1819; Deva & Jain in Indian J. For. 3: 82. 1980. *Veronica agrestris* L., Sp. Pl. 13. 1753; sensu Hook.f., Fl. Brit. India 4: 294. 1884 p.p., non L. 1753; Gamble, Fl. Pres. Madras 960 (678).1923;

Fyson, Fl. South Indian Hill St. 2: t. 198. 1932; A.N. Henry & V. Chithra in Henry et al., Fl. Tamil Nadu 2: 127.1987. **(PLATE 63: 549)**

Distribution: Northern India, Western Tibet and Tamil Nadu. *Habitat*: Moist places.

A tender procumbent herb, pubescent with jointed hairs, few glandular. Leaves 1.2 x 2 cm long, sharply stalked, ovate, cordate at base, coarsely serrate. Flowers in bracteate racemes, pediceled leaf axils, in in blue or white, streaked purple inside. Sepals ovate-elliptic, fringed with simple and a few glandular hairs. Capsule notched.

Flowering & Fruiting: May- August.

Utility: Used in Folk medicine.

Notes: Found in cultivated and wastelands ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 04.11.1994, 221 (TNFDH).

97. SMILACACEAE

SMILAX L.

1. Leaves hastate-lanceolate, less than 3.5 cm wide, 7-ribbed; umbels sessile .... ***S. aspera***
1. Leaves broad-oblong, more than 8 cm wide, 5-ribbed; umbels pedunculate .... ***S. wightii***

579. Smilax aspera L., Sp. Pl. 1028. 1753; Hook. f., Fl. Brit. India 6: 306. 1892; Gamble, Fl. Pres. Madras 1518 (1060). 1928; Fyson, Fl. South Indian Hill St. 2: t. 251. 1932; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 42.1989. *Smilax maculata* Roxb., Fl. Ind. 3: 796. 1832. **(PLATE 63: 550)**

Common names: Chennarvalli, Pomburikodi (M).

Distribution: India, Sri Lanka, South Europe and North Africa. *Habitat*: Shola border.

Climbing shrubs, stems prickly. Leaves to 8 x 6 cm, broadly ovate, acuminate, base broadly cordate, coriaceous, margins crispate, 5-9 nerved; petiole twisted, to 2 cm, sheath reduced, tendrils axillary from the very base, coiled. Umbels sessile on axillary racemes. flowers unisexual; male flowers-perianth lobes 3 mm, lanceolate; filaments 1.2 mm, anthers 1 mm.

Flowering & Fruiting: February - June.

Utility: Used in Ayurveda and Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 29.01.1991, III b 4 (Cairn Hills); PSU & NKK, Kodanad, 17.06.1994, 69 & 20.07.1994, 204 (TNFDH); KNS, Kodanad, 08.05.1963, 449 (FRC).

580. Smilax wightii A. DC. in A. & C. DC., Monogr. Phan. 1: 174. 1878; Hook. f., Fl. Brit. India 6: 310. 1892; Gamble, Fl. Pres. Madras 1519 (1061). 1928; Fyson, Fl. South Indian Hill St. 3: t. 533. 1920; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 42.1989. **(PLATE 63: 551)**

Common names: Karivilanthi, Chooramullu (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Climbing shrubs; branchlets terete, armed with prickles. Leaves 10-15 x 8-13 cm, broadly ovate, apex obtuse, cuspidate, base cordate, 5-ribbed; petiole 1-3 cm long, sheath narrow, flagellate. Peduncle to 10 cm long; umbels alternate, 2 or 3. Flowers many; pedicels 1.5 cm long, 2 cm in fruit. Berry 7 x 7 mm, globose.

Flowering & Fruiting: November - May.

Utility: Used in Folk medicine.

Notes: Climbing on shola trees ± 2100 m, common in Sispara.

KNS, Longwood, 08.05.1963, 488 (FRC).

98. SOLANACEAE

1.	Flowers pendulous, corolla very large, up to 30 cm long	***Brugmansia***
1.	Flowers not pendulous, corolla less than 15 cm long	**2**
2.	Berry completely enclosed by calyx	**3**
2.	Berry not completely enclosed by calyx	**4**
3.	Fruiting calyx cordate-ovate, 5-angled; corolla blue	***Nicandra***
3.	Fruiting calyx angular, not angled; corolla yellow	***Physalis***
4.	Fruit echinate	***Datura***
4.	Fruit indehiscent berries	**5**
5.	Calyx saucer-shaped in fruit	***Lycianthes***
5.	Calyx distinctly lobed in fruit	**6**
6.	Corolla tubular	***Cestrum***
6.	Corolla star-shaped	***Solanum***

BRUGMANSIA Pers.

1. Corolla pink with white shade; capsule, lanceolate-ellipsoid, unarmed .... *B. suaveolens*
1. Corolla white; capsule globose, armed .... *B. arborea*

581. Brugmansia arborea (L.) Steud., Nomencl. Bot. ed. 2, 1: 230 1840. *Datura arborea* L., Sp. Pl. 179. 1753; Gamble, Fl. Pres. Madras 941 (660). 1923; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 112.1987. **(PLATE 64: 552)**

Common names: Angle's Trumpet (E).

Distribution: South America. *Habitat*: Shola border.

Large shrubs. Leaves broadly elliptic-ovate, 15-18 x 8-11 cm, base obliquely rounded, apex acute. Flowers pendulous; calyx to 12 cm long; slightly inflated; corolla white, to 25 cm long. Capsule globose.

Flowering & Fruiting: August - May.

Utility: Used in Homeopathy medicine.

Notes: Naturalised along the shola border ± 2100 m, common in Dodabetta.

PSU & NKK, Naduvattam, 06.03.1991, c 13 (Cairn Hills).

582. Brugmansia suaveolens (Humb. & Bonpl. ex Willd.) Bercht. & Presl, Rostl. 1: 45. 1823; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 111.1987. *Datura suaveolens* Humb. & Bonpl. ex Willd., Enum. Pl. Hort. 227. 1809. **(PLATE 64: 553)**

Common names: Brazil's white Angle's Trumpet, Tree Datura (E); Thuthurisoppu, Ummathae (K).

Distribution: Tropical and subtropical America, grown as a garden plant elsewhere. *Habitat*: Shola border.

Large shrubs or small trees, stems dense to sparsely pubescent. Leaves alternate, entire or shallowly lobed, to 20 x 15 cm, ovate, acute or acuminate, basally rounded or obtuse; petiole to 4-8 cm long. Flowers solitary, axillary, inclined or pendulous; pedicel 2-5 cm long. Calyx tubular, 5-10 cm long, 5- lobed, lobes 1.5-2 cm long, acute or obtuse. Corolla pink, 17-25 cm long, the tube long and slender, the limb strongly plicate in bud, the lobes 5, cuspidate or acuminate. Stamens 5, the filaments slender, inserted on distal part of corolla tube; the anthers linear, basifixed, 25-35 mm long,

longitudinally dehiscent, cohering into a cylindrical tube. Ovary 2-locular, glabrous, ovules numerous; style slender, elongate, stigma 2-lobed. Fruit a 4-valved, indehiscent capsule, lanceolate-ellipsoid, unarmed; seeds numerous, 7-10 x 5-7 mm, compressed, obovoid-semicircular, coarsely rugose-tuberculate, comparatively large.

Flowering & Fruiting: August - May.

Utility: Used in Homeopathy medicine.

Notes: Naturalised along the shola border ± 2050 m, common in Dodabetta.

CESTRUM L.

1. Corolla yellow .... ***C. aurantiacum***
1. Corolla purplish-red **2**

2. Branchlets and inflorescence setaceous .... ***C. parqui***
2. Branchlets and inflorescence pubescent .... ***C. elegans***

583. Cestrum aurantiacum Lindl. in Edward's Bot. Reg. 30: 71. n.65. 1844; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 112.1987. **(PLATE 64: 554)**

Common names: Yellow Shrub Jessamine (E); Raathri Rani Hoovu (K).

Distribution: Native of Central America. *Habitat*: Shola border.

Erect or scrambling shrubs, young parts pubescent. Leaves alternate, ovate-acute or ovate-acuminate, entire, 5-10 x 2-5 cm in size, dark green, margin undulate. Inflorescence axillary or terminal in pedunculate racemose or panicled clusters; peduncles pubescent. Lower flowers pedicillate, upper ones subsessile; bracteoles leaf-like, narrow, lanceolate. Calyx 5-lobed, gamosepalous, cylindrical-campanulate. Corolla obconical in shape, narrowed at base, orange-red in colour. Stamens 5, filaments inserted in the tube, adnate in the lower half of the tube. Ovary seated on an obscure fleshy disk; stigma capitates.

Flowering & Fruiting: August - March.

Notes: A beautiful ornamental shrub invasive in sholas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 18.02.1991, c 14 (Cairn Hills); PSU & NKK, Kodanad, 31.08.1994, 283 (TNFDH).

584. Cestrum elegans (Brongn. ex Neumann) Schltdl., Linnaea 19: 261. 1847; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 112.1987. *Habrothamnus elegans* Brongn. ex Neumann, Ann. Pomone 118. 1844. **(PLATE 64: 555)**

Common names: Butterfly Flower (E).

Distribution: Native of Central America. *Habitat*: Shola border.

Large shrubs with pendulous leafy branches; branches cylindrical, covered with a soft velvety pubescence. Leaves alternate, shortly petioled, 8 x 5 cm, lanceolate or oblong-lanceolate, entire, tip tapering into a point, crisped hairy on both sides, particularly on nerves beneath, deep green in colour. Petiole 1 cm long, pubescent. Inflorescence in axillary or terminal dense pendulous thyrsoid compound racemes. Calyx 2-3 mm long, top-shaped, 5-lobed, triangular-ovate, green. Corolla purplish-red, tubular, 2 cm long, 5-lobed, triangular, mouth and inner surface glabrous. Stamens 5, alternate with petals; anthers yellow. Ovary globose, 2-celled, ovules few in axile plantation; stigma capitates. Fruits berry, deep red purple, many seeded.

Flowering & Fruiting: January - June.

Notes: A beautiful ornamental shrub invasive in sholas ± 2050 m, common in Pykara.

585. Cestrum parqui L' Herit., Strip. Nov. 73. t. 36. 1788; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 112.1987. **(PLATE 64: 556)**

Common names: Chilean Flowering Jasmine (E).

Distribution: Native of Chile; cultivated in warm regions. *Habitat*: Naturalised along Shola border.

Shrubs up to 8 m tall, glabrous. Leaves 7-15 x 15-32 cm, elliptic-lanceolate to lanceolate, subsessile. Flowers greenish-yellow, in cymes or panicles. Corolla infundibuliform, lobes ovate-acute, ciliate. Stamens attached near the throat of the corolla. Anthers oblong.

Flowering & Fruiting: January - June.

Utility: Used in Folk medicine.

Notes: A beautiful ornamental shrub invasive in sholas ± 2100 m, common in Ooty.

DATURA L.

586. Datura stramonium L., Sp. Pl. 179. 1753; Hook. f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Pres. Madras 941 (660). 1923; Fyson, Fl. South Indian Hill St. 3: t. 439. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 113.1987. *Datura stramonium* L. var. *tatula* Clarke in Hook. f., Fl. Brit. India 4: 242. 1883.

Datura tatula L., Sp. Pl. (ed. 2) 256. 1762. *Datura inermis* Jacq., Hort. Vindov. 3: 44. t. 82. 1776. *Datura laevis* L.f., Suppl. Pl. 146. 1781. *Datura bertolonii* Paxt. ex Guss, Fl. Sic. Sy. 1: 267. 1842. *Datura ferox* Nees, Trans. Linn. Soc. London 17: 75. 1837, non L. *Datura wallichii* Dunal in DC., Prodr. 13: 539. 1852. *Stramonium vulgatum* Gaertn., Fruct. 2: 243. t. 132. f. 4. 1791. **(PLATE 64: 557)**

Common names: Common thorn apple, Datura, Devil's apple, Jimson weed, Jamestown weed, Thorn Apple (E); Ummam (M); Simai-oumaththai (T).

Distribution: Widely distributed most parts of the temperate regions of the world. *Habitat*: Shola border.

Subshrubs, to 60-120 cm or more tall, branched, pubescent; the branches often purplish. Leaves 8-17 x 4-13 cm, ovate or broadly so, sinuately dentate, minutely puberulose, cuneate. Petiole 2-5 cm long. Calyx 3.5-5.5 cm long, tubular, 5-dentate, puberulous, persistent. Lobes 6-9 mm long, strongly reflexed in fruit, apiculate. Corolla 7-10 cm long, white or purplish suffused; limb up to 8 cm broad, shallowly 5-lobed, with the lobes, ± triangular-acuminate. Anthers ± 5 mm long, with the lobes narrow oblong, usually white. Capsule erect, 3-4 cm long, ovoid, spiny and densely pubescent, splitting by 4 valves; spines up to 5 mm long. Seeds 3 mm long, reniform, reticulate-foveolate, and black.

Flowering & Fruiting: July - September.

Utility: Used in Ayurveda, Folk, Homeopathy, Siddha and Unani medicine. Whole plant is used for scrofula, scorpion sting poisoning, psychosis, epilepsy, fever, delirium, burning sensation, dyspnoea, leprosy, dysuria, dog-bite poisioning, skin diseases, scabies, asthma, cough, fever, dandruff, piles, earache and eye diseases.

Notes: Found along roadsides and wastelands ± 1800 m, common in Naduvattam.

LYCIANTHES Hasster

587. Lycianthes laevis (Dunal) Bitter, Abh. Nat. Ver. Bremen 24: 484. 1920, ssp. **laevis;** V. Chithra in Henry et al., Fl. Tamil Nadu 2: 113.1987. *Solanum laeve* Dunal, Solan. Synop. 22. 1816; Hook. f., Fl. Brit. India 4: 231.1883; Gamble, Fl. Pres. Madras 936 (657). 1923; Fyson, Fl. South Indian Hill St. 3: t. 433. 1920. **(PLATE 64: 558)**

Common names : Kakke soppu (K).

Distribution: South India, Sri Lanka and Java. *Habitat*: Shola border.

Subshrubs, often scandent; branches zig-zag, angular. Upper leaves often paired and unequal, elliptic-lanceolate, acuminate, to 18 x 6 cm, membranous. Flowers 2-5 in axils; pedicels ca. 8 mm long, enlarges in fruit to 1.5 cm. Calyx truncate or with subulate lobes. Corolla white with pale purple shades, 1 cm across. Berry globose, red, to 1 cm across; seeds angular.

Flowering & Fruiting: December - May.

Utility: Used in Folk medicine.

Notes: Found in shady places of sholas ± 2100 m, common in Pykara.

NICANDRA Adans.

588. Nicandra physalodes (L.) Gaertn., Fruct. 2: 237. t.131. f.2. 1791, "physaloides"; Hook. f., Fl. Brit. India 4: 240. 1883; Gamble, Fl. Pres. Madras 941 (661). 1923; Fyson, Fl. South Indian Hill St. 3: t. 438. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 114.1987. *Atropa physalodes* L., Sp. Pl. 181. 1753. *Physalis daturaefolia* Lam., Encycl. 2: 102. 1786. **(PLATE 64: 559)**

Common names: Apple-of-peru, Shoo-Fly Plant (E); Oomathan (M).

Distribution: Native of South America; now widely naturalised in the Tropics. *Habitat*: Shola border.

Erect subshrubs. Leaves alternate or fascicled, 5-15 x 2-7 cm, sometimes much larger, elliptic, acute at either ends; petiole 3-10 cm long. Flowers 3 cm across, solitary, axillary; calyx campanulate, tube inflated, cordate at base, 5-angled; corolla 2 cm long; 3 cm across, campanulate, blue or bluish violet; stamens 5, free. Berry 1.5 x 1.5 cm, smooth; seeds pitted.

Flowering & Fruiting: October - February.

Utility: Used in Folk medicine.

Notes: A weed in cultivation ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 12.02.1991, II c 19 (Cairn Hills).

589. Physalis peruviana L., Sp. Pl. (ed. 2) 1670. 1762; Hook. f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Pres. Madras 939 (659). 1923; Fyson, Fl. South Indian Hill St. 3: t. 437. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 114.1987. *Physalis edulis* Sims., Bot. Mag. t. 1068. 1807. *Physalis peruviana* L. var. *latifolia* (Lam.) Dunal in DC., Prodr. 13: 440. 1852. *Physalis latifolia* Lam., Tab. Encycl. 2: 20. 1793. *Physalis pubescens* R. Br., Prodr. 1: 447. 1810, non L. **(PLATE 64: 560)**

Common names: Cape Gooseberry, Peruvian ground cherry (E); Dodde budde gida (K); Karimpotti, Malathakkalikeera, Pottapalachedi (M); Pottipollam, Perungunni (T).

Distribution: Tropical South America. *Habitat*: Shola border.

Weak annual erect herbs, to 60 cm high. Leaves alternate, to 7 x 6 cm, broadly ovate, obliquely cordate at base, entire or shortly lobed, 3-nerved from base; petiole to 3 cm long. Flowers axillary, solitary; pedicels 1 cm long, slender; calyx campanulate, accrescent in fruit, membranous; corolla campanulate, yellowish with deep brown centre, 15 mm across, tube hairy inside; stamens 5, anthers vertically splitting; ovary with many ovules, style glabrous; stigma 2-toothed. Berry globose, 10 mm across, covered by the balloon like 2.5-3 cm across fruiting calyx; seeds many, compressed.

Flowering & Fruiting: February - May.

Utility: Used in Ayurveda and Siddha medicine. Roots are boiled in water suppresses diabetes and heal sores of mouth. Whole plant is used for burning sensation, strangury, splenomegaly, ascites, gastropathy, ulcers, cough, bronchitis and erysipeles.

Notes: Naturalised in open areas and shola undergrowth ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 10.05.1994, 43 & 11.08.1994, 203 (TNFDH).

SOLANUM L.

1.	Plants unarmed	**2**
1.	Plants armed; berry yellow, red	**7**
2.	Leaves glabrous, berry usually black	***S. americanum***
2.	Leaves densely stellate tomentose	**3**

3. Climber .... *S. jasminoides*
3. Shrubs or trees 4

4. Shrubs; flowers white; berries red 5
4. Trees; berries yellow 6

5. Plants glabrous .... *S. pseudo-capsicum*
5. Plants tomentose .... *S. denticulatum*

6. Flowers white; tender parts densely stellate tomentose .... *S. erianthum*
6. Trees; flowers violet; tender parts very densely stellate tomentose .... *S. mauritianum*

7. Leaves with prickles 8
7. Leaves without prickles; flowers white .... *S. torvum*

8. Leaves blade sinuate; flowers purple; berry red .... *S. violaceum* ssp. *multiflorum*
8. Leaves blade lacerate or pinnatifid 9

9. Leaves blade lacerate; flowers white, small; berry globose, yellow .... *S. virginianum*
9. Leaves blade pinnatifid; prickles many; flowers white, large .... *S. sisymbrifolium*

590. Solanum americanum Mill., Gard. Dict. (ed. 8) 5. 1768. *Solanum nigrum* sensu Gamble, Fl. Pres. Madras 936 (657). 1923, non L. 1753; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 116.1987. **(PLATE 65: 561)**

Common names: Apple of Sodom, American black nightshade, Black nightshade, Common nightshade, Poison berry (E); Karekanchi, Kakke soppu, Kempu ganikae, Ooruganige (K); Eradakukkeera, Karimthakkali, Mullakuthakkali, Manathakkali, Manithakkali, Tudavalam (M); Manathakkali, Milaguthakkali, Sukitty (T).

Distribution: Cosmopolitan. *Habitat*: Shola border.

Erect annual herbs; stem glabrous or sparsely hispid. Leaves 2-5 x 1-3 cm, ovate or elliptic, base rounded, shortly decurrent on the petiole, subentire, acute to acuminate at apex, membraneous; petiole to 5 cm long. Inflorescence axillary to extra-axillary umbellate cymes; peduncle 1-2 cm long; pedicels 4-6 mm long. Calyx cupular, 5-lobed, minute. Corolla white, 3-4 mm across, subentire. Berry, 4-5 mm across, globose, purplish-black. Seeds ca 1 mm long, discoid, minutely pitted.

Flowering & Fruiting: March - November.

Utility: Used in Ayurveda and Folk medicine. It is a well known plant, whose fruits are edible. Plant is used in the form of juice (10-20 ml) to treat eye diseases, skin

diseases, cough. It is also used for rejuvenation purpose, for conception and helps in delivery of foetus. Used as a green vegetable.

Notes: A weed in cultivation ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 31.01.1991, II c 28 (Cairn Hills); PSU & NKK, Kodanad, 11.03.1994, 372 & 05.07.1994, 84 (TNFDH).

591. Solanum denticulatum Blume, Bijdr. 697. 1825; Hook. f., Fl. Brit. India 4: 231. 1883; Gamble, Fl. Pres. Madras 936 (657). 1923. **(PLATE 65: 562)**

Common names: Kaduganige (K).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Unarmed shrubs, pilose. Leaves in unequal pairs, to 15 x 6 cm and to 6 x 3 cm, elliptic-ovate, membranous, long acuminate, base cuneate, often dentate on the upper half, sparsely pilose, nerves 8-10 pairs; petiole to 6 cm. Flowers axillary, clustered; pedicels 1 cm, white; calyx tube 2 mm, lobes 5-10, 2 mm, densely pubescent; corolla lobes 7 mm, pubescent; ovary 2 mm, style 3 mm, stigma capitate. Berry 7 mm across, red.

Flowering & Fruiting: September - December.

Utility: Used in Folk and Siddha medicine.

Notes: Undergrowth of sholas ± 2050 m, common in Pykara.

KNS, Longwood, 08.05.1963, 476 (FRC).

592. Solanum erianthum D. Don, Prodr. Fl. Nepal. 96. 1825; Roe, Taxon 17: 176. 1968. *Solanum verbascifolium* sensu Clarke in Hook.f., Fl. Brit. India 4: 230. 1883, non L. 1753; Gamble, Fl. Pres. Madras 936 (657). 1923; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 115.1987. **(PLATE 65: 563)**

Common names: Common nightshade (E); Kaadu sunde (K); Chunda, Erichunda, Malachunda (M); Aanai Sundaikkai, Malaichundai (T).

Distribution: South East Asia and North Australia. *Habitat*: Shola border.

Large shrubs or small trees, 3-6 m high, unarmed. Leaves 15-25 x 5-10 cm, elliptic, entire, densely hairy below, sparsely above; nerves prominent; stellate hairs with equal arms; petioles 4 cm long. Cymes terminal or subterminal; peduncle 5 cm long, stout.

Flowers many, erect, densely packed; pedicels 1 cm long; corolla white, densely pubescent outside. Capsule 8 x 8 mm, orange-yellow, hairy when young.

Flowering & Fruiting: July - August.

Utility: Used in Ayurveda and Folk medicine.

Notes: Found in shola border ± 2000 m, common in Kotagiri.

KNS, Burliar-Coonoor road, 23.02.1977, 6616 (FRC).

593. Solanum jasminoides Paxt., Mag. Bot. 8. t. 5. 1840; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 116.1987. *Solanum cynanchoides* Dunal, Velin Facult. Sci. Montpel. 9. t. 809 & in DC., Prodr. 13: 82. 1852. **(PLATE 65: 564)**

Common names: Jasmine nightshade, Potato Vine, White Potato Vine (E).

Distribution: Native of South America; now widely cultivated. *Habitat*: Shola border.

An unarmed shrubby climber. Leaves 3.5-7.5 x 1.5-3 cm, ovate to ovate-lanceolate, glabrous. Flowers in short slender extra-axillary, axillary or terminal slender paniculate cymes, bluish-white to white. Calyx lobes obtuse, mucronate, sparse pubescent. Corolla rotate; the lobes spreading.

Flowering & Fruiting: Throughout the year.

Notes: Naturalized climber in sholas ± 1800 m, common in Naduvattam.

PSU & NKK, Woodbrooke, 02.02.1991, c 27 (Cairn Hills); PSU & NKK, Kodanad, 05.07.1991, 83 & 30.09.1994, 50 (TNFDH); MPRR, Ootacamund, 13.10.1929, 21136 (FRC).

594. Solanum mauritianum Scop., Delic. Fl. Faun. Insubr. 3: 16. 1788; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 116.1987. *Solanum auriculatum* Ait., Hort. Kew. ed. 1., 1: 246. 1789. **(PLATE 65: 565)**

Distribution: Native of South America. *Habitat*: Shola border.

Small trees, all parts densely pubescent with sessile to long-stalked stellate hairs. Leaves simple, alternate, elliptic, up to 30 x 12 cm, entire, apex acuminate, base cuneate, often oblique, petioles 3-9 cm long, each with 1 or 2 smaller auriculate leaves in axils which are sessile, rounded, sometime absent. Flowers numerous in branched corymbs; peduncles up to 15 cm long; pedicels 2-3 mm long. Calyx tube short, 2-3 mm long, lobes narrowly triangular, 1-2mm long. Corolla lilac blue with a pale star-

shaped area at base, stellate, 1.5-2.5 cm in diam. Stamens 5, inserted low on corolla tube. Ovary densely pubescent; lower part of style pubescent; stigma green, terminal. Berries dull yellowish, succulent, globose, 1-1.5 cm in diam., pubescent at least in early stages; seeds numerous, flattened, 1.5-2 mm long, testa minutely reticulate.

Flowering & Fruiting: December - June.

Utility: Used in Folk medicine.

Notes: Found in outskirts of sholas; a quick growing invasive tree ± 2050 m, common in Pykara.

PSU & NKK, Anumapuram, 29.01.1991, c 25 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1994, 166 (TNFDH); PKU, Ooty, 04.05.1962, 767 (FRC).

595. Solanum pseudo-capsicum L., Sp. Pl. 184. 1753; Matthew, Rec. Bot. Surv. India 20: 162. 1969; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 116. 1987. **(PLATE 65: 566)**

Common names: Jerusalem cherry (E).

Distribution: Native of South America, widely naturalised in the tropics and subtropics. *Habitat*: Shola border.

Erect shrubs 90-120 cm tall; branches ascending, glabrous. Leaves 40-80 x 10-20 mm, lanceolate to elliptic-ovate, cuneate, decurrent, entire to repand, obtuse. Peduncles 1-3-flowered, axillary or extra-axillary. Flowers white. Calyx teeth triangular to lanceolate, 4-5 mm long, accrescent. Corolla rotate; limb 11-12 mm broad. Berry globose, 8-12 (-15) mm broad, scarlet-red, shiny. Seeds 3 mm broad, subreniform, minutely reticulate-rugose.

Flowering & Fruiting: October - June.

Utility: Used in Homeopathy medicine.

Notes: Naturalized in shady palces of grasslands and open areas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 26.01.1991, II c 29 (Cairn Hills).

596. Solanum sisymbrifolium Lam., Tabl. Encycl. 2: 25. 1792; Gamble, Fl. Pres. Madras 938(658). 1923; Fyson, Fl. South Indian Hill St. 3: t. 436. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 117.1987. **(PLATE 65: 567)**

Common names: Sticky Nightshade (E).

Distribution: Native of South America. *Habitat*: Shola border.

Stout undershrubs, stems densely covered with fulvous hairs, prickles on stem 8 mm long, 5 mm broad, stout, straight. Leaves 12 x 8 cm, shallowly lyrate, densely pubescent above and below; prickles 1 cm long, narrow, sharp, straight; stellate hairs unequally armed with one erect longer arm. Flowers 12 mm across, 4-8 together, in axillary racemes; pedicels 1 cm long, densely pubescent; corolla blue, thinly tomentose outside. Berry glabrous.

Flowering & Fruiting: Throughout the year.

Utility: Used in Folk and Siddha medicine.

Notes: Found along roadsides and wastelands ± 2050 m, common in Pykara.

PSU & NKK, Pykara, 26.01.1991, II c 30 (Cairn Hills); KNS, Longwood, 20.04.1964, 126 (FRC).

597. Solanum torvum Sw., Prodr. 47. 1788; Hook. f., Fl. Brit. India 4: 234. 1883; Gamble, Fl. Pres. Madras 937 (658). 1923; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 117.1987. **(PLATE 65: 568)**

Common names: Turkey berry, Devil's Fig (E); Busunde, Chundaekkay (K); Anachunda, Chunda, Cheriyamodumutticka, Chithiramchunda, Malamchunda, Parachunda (M); Sundaikai (T).

Distribution: Throughout the tropics. *Habitat*: Shola border.

Shrubs to 2 m tall. Stem densely stellate-hairy when young; prickles few, scattered. Leaves 7-14 x 5-10 cm, ovate, usually coarsely 2-3-sinulate, base obliquely subcordate, apex acute, stellately pubescent on both sides, dense on lower sides, chartaceous, scattered with a few prickles on midrib and on petiole; lateral nerves 4 or 5 pairs; petioles 1.5 - 3.5 cm long. Inflorescence supra-axillary, many-flowered corymbose cymes; peduncle to 5 cm long. Calyx tube 2-2.5 mm long, campanulate, lobes oblong. Corolla white, c. 2.5 cm across; lobes 5-6 mm long, ovate, pubescent outside. Berry 1-1.5 cm across, globose, pale green turning dull orange. Seeds discoid, smooth.

Flowering & Fruiting: July - March.

Utility: Used in Ayurveda, Folk and Siddha medicine. The fruits are used as vegetable. Fumes of burning seeds are inhaled for toothache. Plant is reported to be useful in cough, and as sedative, diuretic and digestive tonic.

Notes: Not a typical shola species rarely found along the edges of shola forests ± 1800 m, rare in Naduvattam.

PSU & NKK, Wenlockdowns, 27.01.1991, L b 51 (Cairn Hills).

598. Solanum violaceum Ortega ssp. **multiflorum** (Clarke) Matthew, Kew Bull. 46: 545. 1991. *Solanum indicum* var. *multiflorum* Clarke in Hook.f., Fl. Brit. India 4: 235. 1883; Gamble, Fl. Pres. Madras 938 (658). 1923; Fyson, Fl. South Indian Hill St. 2: t. 197. 1932. *Solanum anguivi* Lam. var. *multiflora* (Roth ex Roem. & Schult.) Chithra in Henry et al., Fl. Tamil Nadu 2: 115. 1987. **(PLATE 65: 569)**

Common names: Gulla, Chikka potare gida, Chikka shoondae (K); Cheruchunda, Cheruvazhuthana, Nilavalutina (M).

Distribution: Peninsular India. *Habitat*: Shola border.

Erect woody subshrubs; stems prickled; prickles stout, broaden towards the base. Leaves to 15 x 12 cm, shallowly lobed, densely stellate hairy; petiole 3 cm long. Raceme 12-25-flowered, very shortly peduncled. Flowers blue, densely packed; pedicels 1.2 cm long, curved; corolla 22 mm across, glabrous or hairy. Berry 8 mm across, orange-red, smooth.

Flowering & Fruiting: November - January.

Utility: Used in Ayurveda and Folk medicine. This plant has wider medicinal application. Its fruits and roots are used in the form of powder and decoction to treat tastelessness, alopecia, fever, cough, eye diseases, ear diseases, pediatric disorders, piles. It is also used for conception.

Notes: Found along the roadsides and shola border ± 2000 m, common in Kodanad.

599. Solanum virginianum L., Sp. Pl. 187. 1753. *Solanum surattense* Burm. f., Fl. Ind. 57. 1768; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 117.1987. *Solanum xanthocarpum* Schrad. & Wendl., Sert. Hannov. 1: 8. t.2. 1795; Hook. f., Fl. Brit. India 4: 236. 1883; Gamble, Fl. Pres. Madras 938 (658). 1923. **(PLATE 66: 570)**

Common names: Febrifuge plant, Yellow berried nightshade (E); Chittabalanae, Kantakari (K); Kandakarichunda, Kandakarivazhuthina, Kandankathiri, Puttachunda (M); Kandankathiri (T).

Distribution: India, Himalaya, South East Asia, Malesia, Australia, Polynesia. *Habitat*: Shola border.

Subshrubs. Branched diffuse herbs, stems glandular hairy; prickles 2 cm long, spinescent, gradually or not broaden towards the base, present on all parts except berries. Leaves to 13 x 10 cm, lyrate, membranous; petioles to 8 cm long. Peduncle absent. Flowers 2-4 together, axillary; pedicel 2 cm long, stout; corolla 18 mm across, sparsely hispid. Berry 25 mm across, reddish, smooth; seeds flat, not pitted.

Flowering & Fruiting: August - November.

Utility: Used in Ayurveda medicine. Mature fruits are rich source of solasodine which is considered to be an important raw material for commercial production of steroidal drugs.

Notes: Found in wastelands and open areas ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad,14.08.1995, 591 (TNFDH).

99. STAPHYLEACEAE

TURPINIA Vent.

600. Turpinia cochinchinensis (Lour.) Merr., J. Arnold Arbor. 19: 43. 1938; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 86.1983; P.C. Pant in N.P. Singh et al., Fl. India 5: 415. 2000. *Triceros cochinchinensis* Lour., Fl. Cochinch. 184. 1790. *Turpinia nepalensis* Wall. ex Wight & Arn., Prodr. 156. 1834; Gamble, Fl. Pres. Madras 241 (172). 1918. *Turpinia pomifera* sensu Hiern in Hook.f., Fl. Brit. India 1: 698. 1875; Fyson, Fl. South Indian Hill St. 2: t. 69. 1932, non DC. 1824. **(PLATE 66: 571)**

Common names: Neeroli (K); Attuneermulla, Kanali, Kambilivetti, Pambaravetti (M).

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Evergreen trees, to 18 m high; bark thin, brown; blaze yellow. Leaves imparipinnate, opposite; stipules interpetiolar, triangular, cauducous; rachis 3-10.5 cm, stout, swollen at base, glabrous; leaflets 3-9, opposite; stipels lanceolate-subulate; cauducous; petiolule 5-28 mm long, slender, grooved above, opposite; lamina 4-15 x 2.5-6 cm, oblong, elliptic-oblong, ovate or elliptic-ovate, base acute or attenuate, apex acuminate, margin serrate or crenate-serrate, coriaceous, glabrous; lateral nerves 4-8 pairs, pinnate, prominent, intercostae reticulate, prominent. Flowers bisexual, 3-4 mm across, cream

coloured, in terminal or axillary panicles; pedicel short; sepals 5, 1.5 mm long, ovate, obtuse, ciliolulate; petals 5, 3 mm long, ovate, acute; stamens 5, inserted outside the disc; filaments glabrous; disc raised, 5-lobed; ovary sessile, 3-lobed, 3-celled, ovules 2 or more in each cell. Fruit a berry, 12-18 mm, globose, 1-3 lobed, purplish-brown, 3-celled; seeds angular, dark brown; hilum large.

Flowering & Fruiting: March - October.

Utility: Used in Folk medicine.

Propagation: Seeds have poor viability and are to be sown immediately for better germination. Normally no pretreatment is required seeds obtained from freshly collected fruits are sown in well prepared mother beds. The mother beds consist of rooting medium of red soil: Sand at 1:1 ratio. 40% germination appeared from 20 to 25 days.

Notes: A common shola tree ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 22.06.1994, 72 & 21.11.1994, 488 (TNFDH); SAF, Aramby shola, 22.04.1933, 2757 (FRC).

100. SYMPLOCACEAE

SYMPLOCOS Jacq.

1. Spikes branched .... ***S. cochinchinensis* ssp. *laurina***
1. Spikes or racemes unbranched **2**

2. Inflorescence 4-many flowered **3**
2. Inflorescence few, under 4-flowered .... ***S. pendula***

3. Inflorescence fulvous villous .... ***S. foliosa***
3. Inflorescence glabrous .... ***S. obtusa***

601. Symplocos cochinchinensis (Lour.) Moore ssp. **laurina** (Retz.) Nooteb., Rev. Symplocac. 156. 1975 & in Dassan & Fosb., Rev. Handb. Fl. Ceylon 3: 458. 1981; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 68.1987. *Myrtus laurina* Retz., Obs. Bot. 4: 26. 1786. *Drupatris cochinchinensis* Lour., Fl. Cochinch. 314. 1790. *Symplocos spicata* Roxb., Fl. Ind. 2: 542. 1832; Hook. f., Fl. Brit. India 3: 573. 1882; Fyson, Fl. South Indian Hill St. 3: t. 413. 1920. *Symplocos spicata* Roxb. var. *laurina* (Retz.) Clarke in Hook. f., Fl. Brit. India 3: 573. 1882; Gamble, Fl. Pres. Madras 782 (549). 1921. *Symplocos spicata* Roxb. var. *malasica* Clarke in Hook. f., Fl. Brit. India 3: 573. 1882. *Symplocos spicata* Roxb. var. *attenuata*

(A.DC.) Clarke in Hook. f., Fl. Brit. India 3: 573. 1882. *Symplocos laurina* (Retz.) Wall. ex G. Don, Gen. Hist. 4: 3. 1837-1838. **(PLATE 66: 572, 572 a)**

Common names: Chunga (E); Boodaganni, Changa, Manjatte, Munjiramani, Rudurakshi mara, Chunge mara (K); Kamblivetti, Pachotti, Parala, Pambari (M); Kambli-vetti, Vaspamaram, Vella-lothi (T).

Distribution: Indo-Malesia and China. *Habitat*: Shola border.

Evergreen trees. Leaves simple, alternate, estipulate; lamina 5.5-15 x 2.5-6 cm, elliptic, elliptic-lanceolate or elliptic-oblong, base acute to attenuate, apex acute or acuminate, margin crenate-serrate, revolute, glabrous, yellow when dry, coriaceous or chartaceous; lateral nerves 7-8 pairs, pinnate, slender, glabrous; intercostae reticulate, faint. Flowers bisexual, white, in axillary simple or branched spikes, 7 cm long, pubescent; bracts solitary at the base of each pedicel; bracteoles early cauducous; calyx tube adnate to the ovary, lobes 5, minute, lobes 1 mm, triangular; corolla 1 cm across, lobes 5, ovate, 3 mm, recurved; stamens many, equal, arranged in 5 group; ovary 1 mm, inferior, globose 2-3-celled, ovules 2 in each cell, pendulous from the inner angle; style 5 mm, simple; stigma capitate. Fruit a drupe, 8 mm across, glabrous, ampulliform, globose ribbed, purple crowned by calyx lobes; seeds 1-3, oblong.

Flowering & Fruiting: March - May.

Utility: Used in Ayurveda medicine. Stem bark is used for uterine complaints, vaginal diseases, menstrual disorders. It is useful in bowel complaints such as diarrhoea and dysentery, eye diseases, fever, cough, ulcers, swellings, menorrhagia and leucorrhoea. The decoction of the bark is used as a gargle for giving firmness to spongy and bleeding gums. Bark grinded and boiled in water and taken internally for urinary diseases.

Propagation: The seeds are viable for three months. Matured depulped, dried seeds are immersed in cow dung solution for two hrs before sowing in the mother bed. Germination is noticed from 50 to 60 days. Germination is about 50 %.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Pykara. The Red listed status of this species is Least Concern for Tamil Nadu and Kerala and Near Threatened to Karnataka.

PSU & NKK, Glenmorgan, 26.01.1991, b 36 (Cairn Hills); PSU & NKK, Kodanad, 10.10.1994, 194 & 25.11.1994, 457 (TNFDH); KNS, Longwood, 20.04.1964, 1207 (FRC).

602. Symplocos foliosa Wight, Ic. t. 1234. 1848; Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras 783 (550). 1921; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 68.1987. *Symplocos nervosa* Wight, Ic. t. 1235. 1848, non DC. 1844. **(PLATE 66: 573, 573 a)**

Common names: Parala (M); Palvellodai (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Trees, to 6 m high; branchlets fulvous tomentose, glabrous when mature. Leaves simple, alternate, estipulate; petiole 5-20 mm, long, stout, tomentose, grooved above; lamina 6-12 x 2-5 cm, elliptic or oblong, base acute, apex acuminate, margin serrate, glabrous, coriaceous; lateral nerves 8-12 pairs, pinnate, glabrous, prominent, midrib beneath hispid; intercostae reticulate, prominent. Flowers bisexual, white; spikes unbranched, densely fulvous tomentose; bracts 4-6 x 2-2.5 mm, cauducous, brown tomentose; bracteoles early cauducous; calyx tube adnate to the ovary, lobes 5, lobes 2-3 mm long, ovate, pubescent, tube 2-2.5 mm; corolla lobes 5, 3.5-4 mm long, orbicular, ciliate; stamens 30-40, unequal, many seriate, adnate to the corolla tube; anthers short; ovary 2-2.5 mm long, inferior, ovules 2-3 in each cell, pendulous from the inner angle; style filiform; stigma capitate. Fruit a drupe, 10 x 5 mm, ovoid, yellow.

Flowering & Fruiting: November - February.

Notes: Found in the ecotone region of sholas and grasslands ± 2050 m, common in Sispara.

KNS, Glemmorghan, 11.05.1963, 547A (FRC).

603. Symplocos obtusa Wall. ex G. Don, Gen. Hist. 4: 3. 1837-1838; Gamble, Fl. Pres. Madras 783 (550). 1923; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 69.1987. *Symplocos laeta* var. *pedicellata* Clarke in Hook. f., Fl. Brit. India 3: 583. 1882. *Symplocos obtusa* Wall. ex G. Don var. *pedicellata* (Clarke) Nooteb., Rev. Symplocac. 244. 1975 & Rev. Handb. Fl. Ceylon 3: 467. 1981. **(PLATE 66: 574)**

Distribution: South India and Sri Lanka. *Habitat*: Shola border.

Trees, to 10 m high; young parts glabrous. Leaves simple, alternate, estipulate; petiole 20-30 mm long, slender, glabrous, grooved above; lamina 6-11 x 4-6.5 cm, obovate, base cuneate, apex obtuse, margin entire or serrate, glabrous, coriaceous; lateral nerves 5-8 pairs, glabrous, pinnate, prominent; intercostae reticulate, prominent. Flowers

bisexual, in unbranched 2-3 cm long racemes, axis hispid; bracts ovate, cauducous; bracteoles early cauducous; pedicels 1 mm long, slender; calyx tube adnate to the ovary, lobes 5, 1.5 x 1 mm, obtuse, hairy; corolla lobes 5; stamens numerous, unequal, many seriate, adnate to the corolla tube; anthers short, ovary inferior, ovules 2-3 in each cell, pendulous from the inner angle. Fruit a drupe, 12 x 5 mm, terete, yellowish-green, minutely hispid towards apex; seeds 1-3, oblong.

Flowering & Fruiting: May - November.

Notes: Found in the ecotone region of sholas and grasslands ± 1800 m, common in Thaishola.

KNS, Kodanad, 09.05.1963, 510 (FRC).

604. Symplocos pendula Wight, Ic. t. 1237. 1848; Hook. f., Fl. Brit. India 3: 587. 1882; Gamble, Fl. Pres. Madras 784 (551). 1923; Fyson, Fl. South Indian Hill St. 2: t. 186. 1932; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 68.1987. *Symplocos sessilis* Clarke in Hook.f., Fl. Brit. India 3: 587. 1882; Gamble, Fl. Pres. Madras 784 (551). 1923. **(PLATE 66: 575)**

Distribution: Indo-Sri Lanka to South East Asia. *Habitat*: Shola border.

Small trees or large shrubs. Leaves simple, alternate, 2-5 x 1.2 cm, elliptic-obovate, obtuse to emarginate at apex, narrowly attenuate at base. Flowers sessile to subsessile, erect. Calyx tube 0.2-0.25 cm long; lobes 0.1 cm long, round at tip, ciliate on margins. Corolla pink, rotate, 1-1.2 cm across. Stamens many, joined with corolla. Ovary 0.15-0.2 cm long, ovoid; stigma capitate. Drupe 1-1.5 cm long, 0.3-0.4 cm diam., cylindric, oblong.

Flowering & Fruiting: January - October.

Notes: Found in the ecotone region of sholas and grasslands ± 2100 m, common in Dodabetta.

KNS, Staircase shola, 09.025.1963, 65 (FRC).

101. THEACEAE

1. Leaves entire, recurved; branchlets and petiole reddish .... ***Ternstroemia***
1. Leaves crenate or serrate; branchlets and petiole not reddish **2**

2. Flowers solitary, to 5 cm across; fruit capsular .... ***Gordonia***
2. Flowers fascicled, to 0.5 cm across; fruit a berry .... ***Eurya***

EURYA Thunb.

605. Eurya japonica Thunb., Fl. Jap. 191. t. 25. 1784; Hook. f., Fl. Brit. India 1: 284. 1874; Fyson, Fl. South Indian Hill St. 2: t. 33. 1932; Gamble, Fl. Pres. Madras 79 (57). 1915; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 184. 1993. **(PLATE 66: 576)**

Common names: Mukkorone, Hulini, Hulumi, Padichii, Yeramadlae (K); Kooramar (M); Huluni (T).

Distribution: South India and East Asia. *Habitat*: Shola border.

Trees. Leaves 4-6 x 1.5-3 cm, obovate to elliptic, acute to shortly acuminate at apex, round to broadly attenuate at base, finely crenate-serrate on margins, black on drying; nerves many, close and parallel. Flowers dioecious, solitary to few flowered axillary and lateral clusters. Peduncles 0.1-0.2 cm long. Sepals 5, 0.05-0.1 cm long, ovate, slightly unequal. Petals 5, white, ca 0.1 cm long, orbicular. Stamens 12-15. Ovary minute, 2-3 celled; ovules many in each cell; styles as many as ovary cells. Berry subglobose, 0.1-0.2 cm diam.; stylar parts persistent. Seeds minute, tuberculate.

Flowering & Fruiting: March - December.

Utility: Used in Folk medicine.

Notes: Found in shola border ± 2050 m, common in Pykara.

PSU & NKK, Kodanad, 25.11.1994, 370 (TNFDH); BMR, Ooty, 00.05.1962, 1688 (FRC).

GORDONIA Ellis

606. Gordonia obtusa Wall.ex Wight & Arn., Prodr. 87. 1834; Hook. f., Fl. Brit. India 1: 291. 1874; Gamble, Fl. Pres. Madras 79 (57). 1915; Fyson, Fl. South Indian Hill St. 2: t. 34. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 29.1983; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 162. 1993. *Gordonia obtusifolia* Wight, Illustr. 1: 99. 1838. *Gordonia parvifolia* Wight, Illustr. 1: 99. 1838. **(PLATE 67: 577)**

Common names: Malaraga, Negatta (K); Adangi, Chembarasan, Karikkova, Kattukarana (M); Miyilai (T).

Distribution: Endemic to Western Ghats. *Habitat*: Shola border.

Trees; branchlets tomentose. Leaves simple, alternate; lamina 3.5-15 x 1.5-5 cm, elliptic, elliptic-oblong or elliptic-oblanceolate, base cuneate, acute or attenuate, apex acute, acuminate or obtuse, margin crenate or serrate, glabrous, coriaceous. Flowers bisexual, white, solitary, terminal or upper axillary; pedicels 2-5 mm long, pubescent. Sepals 5, free, unequal, orbicular, pubescent outside, glabrous inside. Petals 5, obovate, pubescent outside, glabrous inside, notched at the tip, extreme base united. Stamens numerous, unequal, adnate to the base of the petals. Ovary superior, ovoid, tomentose 5-celled, ovule 4-8 in each cell; style 1, stout, ribbed; stigma 6-lobed. Fruit a capsule, oblong with short acumen, 5-angled, valves deeply sulcate above; seeds ellipsoid, winged, wings 6-10 mm long, brownish.

Flowering & Fruiting: October - May.

Utility: Used in Folk and Siddha medicine.

Notes: Commonly seen in evergreen forests and rare occurrence in sholas ± 1820 m, common in Naduvattam.

PSU & NKK, Outcherlony, 02.02.1991, I b 48 (Cairn Hills); PSU & NKK, Kodanad, 05.10.1994, 193 & 14.11.1994, 274 (TNFDH); KNS, Ootacamund, 07.05.1963, 446 (FRC).

TERNSTROEMIA Mutis ex L.f.

607. Ternstroemia gymnanthera (Wight & Arn.) Bedd., Fl. Sylv. 91, t. 91. 1871; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 190. 1993. *Cleyera gymnanthera* Wight & Arn., Prodr. 87. 1834. *Ternstroemia japonica* sensu Hook. f., Fl. Brit. India 1: 280. 1874, non (Thunb.) Thunb. 1794; Gamble, Fl. Pres. Madras 78 (56). 1915; Fyson, Fl. South Indian Hill St. 2: t. 32. 1932; V. Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 30.1983. **(PLATE 67: 578)**

Common names: Japanese Cleyera, Japanese Ternstroemia (E); Kiamonu, Kemmuni (T).

Distribution: South East Asia and China. *Habitat*: Shola border.

Trees; branchlets reddish, glabrous, terete. Leaves simple, alternate, often clustered at apices of branchlets, estipulate; petiole 5-25 mm, glabrous, stout, reddish; lamina 4-8 x 1.5-3.5 cm, obovate, oblanceolate or elliptic-lanceolate, base cuneate, apex acute or obtuse, retuse, margin entire, slightly revolute, coriaceous, glabrous. Flowers unisexual, axillary or extra axillary, solitary, pale yellow, fragrant; pedicels 8-10 mm

long, stout, 2-ridged; 2 small ovate bracteoles at the base of calyx. Calyx 5, broadly ovate to orbicular, coriaceous, glabrous, persistent, connate at the base. Petals 5, obovate-cuneate, leathery, connate at the base. Stamens numerous, yellow, free. Ovary superior, 4-5 mm long, 2-3-celled, ovules 2 in each cell; style simple; stigmas 3, sessile. Fruit a berry, ovoid or globose, tipped with persistent style, brown; seeds 3-4, angular, red.

Flowering & Fruiting: April - July.

Utility: Used in Folk medicine.

Propagation: Viability of seeds is for one month. The fleshy red colored fruits are collected and four celled seeds are removed, dried in sunlight and spread over the well prepared mother beds and watered regularly. Germination is about 50 %.

Notes: A typical shola tree ± 1800 m, common in Naduvattam.

KNS, Longwood, 20.04.1964, 1202 (FRC).

102. THYMELEACEAE

GNIDIA L.

608. Gnidia glauca (Fresen.) Gilg in Engl., Bot. Jahrb. Syst. 19: 265. 1894; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 214.1987. *Lasiosiphon glaucus* Fresen., Flora 21: 603. 1838. *Gnidia eriocephala* Meisner in Denkschr., Koenigl.-Baier. Bot. Ges. Regensburg 3: 292. 1841. *Lasiosiphon eriocephalus* (Meisner) Decne. in Jacq., Voy. Bot. 148. 1844; Hook. f., Fl. Brit. India 5: 197. 1886; Gamble, Fl. Pres. Madras 1244 (871). 1925; Fyson, Fl. South Indian Hill St. 3: t. 480. 1920. **(PLATE 67: 579)**

Common names: Fish Poison Bush (E); Mukkude (K); Nanjinar, Nanju (M); Nacchinar, Vandakollipatti (T).

Distribution: India, Sri Lanka and Africa. *Habitat*: Shola border.

Trees; branchlets angular and pubescent, becoming terete, glabrous and brown with age; leafscars prominent. Leaves simple, alternate, crowded towards the apex of branchlets, estipulate; lamina 7-11 x 2-2.5 cm, linear-oblong, base attenuate, apex acute, margin entire, glabrous above, puberulent beneath, coriaceous. Flowers bisexual, bright yellow, in terminal white silky compact heads surrounded by an involucre of silky bracts; pedicels 2 mm, densely pilose. Calyx tube to 1.5 cm, densely

long pilose without; lobes 5, 3 mm, oblong, pilose without. Petaloid appendages 8, yellow, terete, fleshy. Stamens 8-10, in 2 rows. Ovary superior, sessile, oblong, 1-celled; style filiform, stigma capitate. Fruit a berry, 4 mm long, ellipsoid, densely pilose, enclosed in the calyx; seed brown, ridged laterally.

Flowering & Fruiting: January - May.

Utility: Used in Folk medicine.

Notes: Found in margins of sholas ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 01.02.1991, d 68 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 472 & 20.09. 1994, 169 (TNFDH).

103. ULMACEAE

1. Leaves glaucous below; margin serrulate throughout; anthers introse .... ***Trema***
1. Leaves not glaucous below; margin entire or distally serrate; anthers extrose .... ***Celtis***

CELTIS L.

1. Leaves with 1 or more strong primary nerves above the basal ribs, membranous, usually oblique, serrate; flowers 4-merous .... ***C. tetrandra***
1. Leaves without strong primary nerves above the basal ribs, coriaceous, not oblique, entire; flowers 5-merous .... ***C. philippensis*** var. ***wightii***

609. Celtis philippensis Blanco var. **wightii** (Planch.) Soep. in Steenis, Fl. Males. ser. 1. 8: 62. 1977; G. R. Kumari in Henry et al., Fl. Tamil Nadu 2: 249.1987. *Celtis wightii* Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 307. 1848; Hook. f., Fl. Brit. India 5: 483. 1888; Gamble, Fl. Pres. Madras 1349 (944). 1928; Fyson, Fl. South Indian Hill St. 3: t. 503. 1920. **(PLATE 67: 580)**

Common names: Bhoothakkali, Kalluveera, Peenari, Vellakkuyyan (M); Kodaalimurukki, Vakkanai, Vellai thovarai (T).

Distribution: Indo-Malesia to Australia and Tropical Africa. *Habitat*: Shola border.

Trees, to 25 m high, bark pale green or grey with black streaks inside, covered with lenticels; blaze speckled with black and yellow; branchlets pubescent. Young foliage pink. Leaves simple, alternate; stipules lateral, elliptic-ovate; petiole 4-15 mm, slender, pubescent; lamina 6-12 x 2-6 cm, ovate, elliptic or elliptic-oblong, base round or acute, apex acuminate, margin entire, glabrous, coriaceous; 3-nerved from the base, prominent, intercostae scalariform, prominent. Flowers polygamous, yellow, in

axillary puberulous cymes, usually on new shoots; male flowers usually at the basal part and female flowers on the upper side; tepals 5, 2 x 1 mm, ovate, concave, ciliate, membranous; stamens 5, free, inserted round a woolly torus; ovary superior, sessile, ovoid, 1 mm, 1-celled; style 8 mm long, pubescent. Fruit a drupe 7 x 5 mm, ovoid, smooth.

Flowering & Fruiting: March - June.

Utility: Used in Folk and Siddha medicine.

Notes: Found inside the sholas ± 1800 m, common in Thaishola.

PSU & NKK, Wenlockdowns, 21.02.1991, III a 36 (Cairn Hills); PSU & NKK, Kodanad, 14.11.1994, 231 (TNFDH).

610. Celtis tetrandra Roxb., Fl. Ind. 2: 63. 1832; Hook. f., Fl. Brit. India 5: 482. 1888; Gamble, Fl. Pres. Madras 1348 (944). 1928; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 250.1987. *Celtis serotina* Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 301. 1848. **(PLATE 67: 581)**

Common names: Aduva (K); Karukkuyyan, Kuyyamaram, Oma, Poochakkurumaram (M); Ada, Kona, Kuviya, Murungan (T).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Trees; branchlets slender, pubescent. Leaves simple, alternate; stipules linear-lanceolate, lateral, free; lamina 5-14 x 2.5-7 cm, obliquely ovate or obliquely ovate-lanceolate; base oblique, apex acuminate, margin serrate from apex to below middle then entire, membranous, glabrous above, puberulent beneath; 3-nerved from base, prominent. Flowers polygamous, yellow; male in axillary clusters, born on leafless shoots; pedicels 1 cm long, filiform; female flowers on leaf axils; tepals 4, 1.5 mm long, ciliate, concave, obtuse; stamens 4, inserted round a woolly torus; ovary sessile, obovoid, pubescent, 1-celled; style ciliate. Fruit a drupe, 7 x 6 mm, ovoid, glabrous.

Flowering & Fruiting: February - March.

Propagation: Seeds are removed from the drupe and dried in sunlight. Dried seeds are sown in well prepared in mother bed. Germination occurs between 20 & 30 days and records 50% germination. Transplantable size is achieved in 60-75 days when two pair of leaves is seen. Initial growth after transplanting is very slow. Often leaf shedding and yellowing are noticed. DAP application and neem cake powder solution of 5 dosage is necessary. It needs more than 10 months to 75 cm height with woody stem.

This is the optimum size for planting out in the field. Seeds are viable for two months.

Notes: A tree with ecological value, wood is used in Assam for planting, canoes etc. Found in shola border ± 2050 m, common in Pykara.

KNS, Staircase shola, 23.04.1964, 1268 (FRC).

TREMA Lour.

611. Trema orientalis (L.) Blume, Mus. Bot. Lugd.-Bat. 2: 62. 1856; Hook. f., Fl. Brit. India 5: 484. 1888; Gamble, Fl. Pres. Madras 1350 (944). 1928; Fyson, Fl. South Indian Hill St. 3: t. 504. 1920; R. Gopalan in Henry et al., Fl. Tamil Nadu 2: 250.1987. *Celtis orientalis* L., Sp. Pl. 1044. 1753. *Sponia wightii* Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 322. 1848. **(PLATE 67: 582)**

Common names: Charcoal tree, Gunpowder tree, Oriental nettle, Oriental trema (E); Amathali (K); Aamathali, Aarni, Amapotti, Amarathi, Ami, Javanthi, Omamaram, Pottama, Pottamaram, Ratthi, Thundinaru (M); Amathalai, Ambaratthi, Mena, Nudalei, Oman (T).

Distribution: Tropical Africa, Asia and Australia. *Habitat*: Shola border.

Dioecious trees; branchlets scabrous to adpressed pubescent. Leaves simple, alternate; stipules lateral, cauducous; petiole 5-10 mm, slender, tomentose, grooved above; lamina 7.5-15 x 2.5-6 cm, ovate-lanceolate, ovate or oblong-lanceolate, base obliquely cordate, apex acuminate, margin serrulate, scabrid above, tomentose beneath, chartaceous, 3-5-ribbed from base, prominent. Flowers unisexual, 3-4 mm across, greenish, in axillary fascicles or cymes; male flowers usually sessile; tepals 4 or 5, equal, 2 mm long, curved, ciliate; stamens 5; pistillode oblong; female flowers : tepals unequal, ciliate; ovary superior, sessile, 1-celled, ovate; style bifid, villous; stigma plumose. Fruit a drupe, 4 x 3 mm, globose, black; stylar tip persistent; seed globose.

Flowering & Fruiting: September - December.

Utility: Used in Ayurveda, Folk and Siddha medicine. Decoction of roots is given in diarrhoea and presence of blood in urine. Root barks and leaves used in epilepsy.

Notes: Found in all types of forests; early colonizer on cleared slopes ± 1800 m, common in Naduvattam.

PSU & NKK, Naduvattam, 08.02.1991, a 46 (Cairn Hills); PSU & NKK, Kodanad, 30.09.1994, 172 (TNFDH).

104. URTICACEAE

1. Plants with conspicuous white stinging hairs 2
1. Plants without conspicuous white stinging hairs 4

2. Herbs; stems grooved .... *Urtica*
2. Undershrubs; stems not grooved 3

3. Leaves 3-7 lobed; female perianth of 3 fused tepals forming a 1-sided cover over the ovary .... *Girardinia*

3. Leaves not lobed; female perianth of 4 free, very unequal tepals, covering the side of the ovary .... *Laportea*

4. Flowers aggregated on a fleshy receptacle 5
4. Flowers not on a fleshy receptacle 6

5. Both male and female flowers on fleshy receptacle; stamens 4; lithophytes .... *Elatostema*
5. Male flowers cymose, female ones on fleshy receptacle; stamens 5; epiphyte .... *Procris*

6. Flowers enclosed in a campanulate involucre .... *Droguetia*
6. Flowers not enclosed in a campanulate involucre 7

7. Inflorescence racemose; leaves serrate .... *Pilea*
7. Flowers in sessile clusters; leaves entire .... *Pouzolzia*

DROGUETIA Gaud.

612. Droguetia iners (Forssk.) Schweinf., Bull. Herb. Boissier. 4, Appendix 2: 146. 1896, ssp. **urticoides** (Wight) Friis & Wilmot-Dear, Nordic J. Bot. 7: 126. 1987. *Forskohlia urticoides* Wight, Ic. t. 1982. 1853, non *Droguetia urticoides* (Wight) Wedd. 1854. *Droguetia diffusa* Wedd., Ann. Sci. Nat. Bot. ser. 4, 1: 211. 1854; Hook. f., Fl. Brit. India 5: 593. 1888; Gamble, Fl. Pres. Madras 1386 (969). 1928; Fyson, Fl. South Indian Hill St. 2: t. 240. 1932; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 244.1987. **(PLATE 67: 583)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Monoecious, slender, diffuse herbs; branchlets grooved, reddish; indumentum of curly hairs. Leaves decussate, ovate, to 4.5 x 2.5 cm, membranous, base obtuse, margin coarsely crenate, apex acuminate, hispid above and on nerves below; cystoliths punctiform; petiole to 2 cm; stipule linear-lanceolate, 3 mm. Flower(s) enveloped in axillary, scabrid, campanulate, involucres 3 mm wide. Staminate flowers 3 to the involucre. Perianth tubular-clavate, 3-5-fid. Stamen 1. Pistillode 0. Pistillate flower

solitary, in the lower axils. Perianth 0. Ovary woolly, 1-celled; ovule 1, erect; stigma hispid. Achene ovoid, compressed, woolly; seed 1.

Flowering & Fruiting: October - June.

Notes: Found in shady, shola floor ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 29.01.1991, a 38 (Cairn Hills).

ELATOSTEMA J. R. & G. Forst.

1.	Normal leaves substended by several very small leaves	***E. surculosum***
1.	Leaves without small leaves subtending	**2**
2.	Leaf-margin with several deep teeth; apex acute to acuminate	***E. sessile***
2.	Leaf-margin with a few shallow teeth; apex caudate	***E. lineolatum***

613. Elatostema lineolatum Wight, Ic. t. 1984. 1853, var. **lineolatum**; Hook. f., Fl. Brit. India 5: 565. 1888; Gamble, Fl. Pres. Madras 1376 (963). 1928; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 244.1987. **(PLATE 67: 584)**

Distribution: India, Myanmar and Sri Lanka. *Habitat*: Shola border.

Subshrubs; branches scandent, pilose. Leaves to 9 x 3 cm, rhomboid, acuminate at apex, gibbous at one side, crenate, 3-ribbed from base, sessile, shortly hispid; lateral nerves 4 pairs from the midrib; cystolith scattered. Receptacle 0.5-1.5 cm across, 2-3 together, axillary. Male flowers pedicellate; bracteoles 3 mm long, oblanceolate; perianth lobes 4, 1.5 x 1 mm, hairy at apex, red-glandular; stamens 4, anthers deeply cleft at base.

Flowering & Fruiting: March - April.

Utility: Used in Folk medicine.

Notes: Found in moist, open slippery rocks, inside sholas ± 2100 m, common in Dodabetta.

PSU & NKK, Kinnakorai, 19.02.1991, a 39 (Cairn Hills); KNS, Bangithapal, 12.05.1963, 621(FRC).

614. Elatostema sessile J.R. Forst. & J.G.A. Forst., Char. Gen. Pl. (ed. 1) 53. 1775; Hook. f., Fl. Brit. India 5: 563. 1888; Gamble, Fl. Pres. Madras 1376 (962). 1928; Fyson, Fl. South Indian Hill St. 2: t. 238. 1932; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 245.1987. **(PLATE 67: 585)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Gregarious herbs, on moist rocks in shade, rooting below; branchlets to 40 cm, zig-zag. Leaves alternate, obliquely lanceolate, to 10 x 3 cm, subsessile; base obtuse, margin with more than 8 deep teeth, apex acute; stipules lanceolate. Inflorescence axillary, of densely crowded unisexual flowers subtended by free bracts in the staminate and fused ones in the pistillate fleshy receptacles. Staminate: Tepals 4, ovate, dorsally appendaged. Stamens 4. Pistillate: Tepals 4, dentate. Ovary 1-celled; ovule 1; stigma penicillate. Achene ovoid.

Flowering & Fruiting: October - November.

Utility: Used in Folk medicine.

Notes: Found in moist, open slippery rocks, inside sholas ± 2100 m, common in Pykara.

PSU & NKK, Naduvattam, 06.02.1991, a 40 (Cairn Hills).

615. Elatostema surculosum Wight, Ic. t. 2091. 1853; Hook. f., Fl. Brit. India 5: 572. 1888; Gamble, Fl. Pres. Madras 1377 (963). 1928; Fyson, Fl. South Indian Hill St. 3: t. 508. 1920; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 245.1987. **(PLATE 68: 586)**

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Gregarious, subsucculent, herbs in moist rocks, rooting below; branchlets to 25 cm, zig-zag. Leaves alternate, obliquely lanceolate, to 6 x 2.5 cm, subtended by several very small leaves, margin deeply dentate, apex caudate; stipules lanceolate. Inflorescence axillary, 1.3 cm wide, subtended by bracts and bracteoles. Flowers unisexual. Staminate: Tepals 4, ovate, basally connate. Stamens 4. Pistillate: Tepals 5. Ovary 1-celled; ovule 1. Achene ovoid.

Flowering & Fruiting: October - December.

Notes: Found in moist, open slippery rocks, inside sholas ± 2050 m, common in Sispara.

PSU & NKK, Kodanad, 06.06.1994, 58 (TNFDH).

GIRARDINIA Gaud.

616. Girardinia diversifolia (Link) Friis, Kew Bull. 36: 145. 1981; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 245.1987. *Urtica diversifolia* Link, Enum. Hort.

Berol. 2: 385. 1822. *Girardinia heterophylla* Decne. in Jacq., Voy. 4: 151. t.153. 1844; Hook. f., Fl. Brit. India 5: 551. 1888 incl. var. *palmata*. *Girardinia leschenaultiana* Decne. in Jacq., Voy. 4: 152. 1844; Gamble, Fl. Pres. Madras 1372 (960). 1928. *Girardinia zeylanica* Decne. in Jacq., Voy. 4: 152. 1844; Gamble, Fl. Pres. Madras 1373 (960). 1928. *Girardinia heterophylla* Decne. var. *zeylanica* (Decne.) Hook. f., Fl. Brit. India 5: 551. 1888. **(PLATE 68: 587)**

Common names: Nilghiri nettle (E); Turike (K); Aanachoriyanam, Aanachenthotti, Choriyanam, Chenthotti, Kuttithoova (M).

Distribution: Tropical Asia. *Habitat*: Shola border.

Subshrubs with white stinging hairs. Leaves alternate, 3-7-lobed, 8-15 x 10-17 cm, base cordate, lobes margin inciso-serrate, densely strigose, 3-ribbed from base; stipules to 1.5 x 1 cm, broadly oblong, auricled, acute; petiole to 10 cm long, reddish. Male flowers in axillary, cylindrical branched or unbranched spikes, white; tepals 4, ca 2 mm long, ovate, cucullate; stamens 4; pistillode globose. Female flowers in subterminal heads; tepals connate into a ventricose tube, 2-4-lobed; ovary flattened, ovate, style filiform. Achenes ca 3 mm across, compressed.

Flowering & Fruiting: October - November.

Utility: Used in Folk medicine.

Notes: Found in outskirts of sholas ± 2100 m, common in Pykara.

PSU & NKK, Naduvattam, 06.03.1991, a 41 (Cairn Hills).

LAPORTEA Gaud.

617. Laportea bulbifera (Sieb. & Zucc.) Wedd., Monogr. Urtic. 9: 139. 1856; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 245.1987. *Urtica bulbifera* Sieb. & Zucc., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 4: 214. 1846. *Laportea terminalis* Wight, Ic. t. 1972. 1853; Hook. f., Fl. Brit. India 5: 549. 1888; Gamble, Fl. Pres. Madras 1373 (961). 1928; Fyson, Fl. South Indian Hill St. 2: t. 236. 1932. **(PLATE 68: 588)**

Common names: Chenthatti, Choriyanam, Thoova (M).

Distribution: India and Sri Lanka. *Habitat*: Shola border.

Prickly herbs. Leaves 10-16 x 5-8 cm, ovate, acute at apex, cordate at base, serrate, densely bristled above; nerves to 4 pairs, reticulate; petiole to 8 cm long. Cymes

terminal to 10 cm across; pedicels flattened. Achenes 2 mm across, compressed, obovoid, black.

Flowering & Fruiting: November - February.

Utility: Used in Folk medicine.

Notes: Found in outskirts of sholas ± 2050 m, common in Pykara.

PSU & NKK, Naduvattam, 01.02.1991, 43 (TNFDH); KNS, Longwood, 08.05.1963, 486 (FRC).

PILEA Lindl.

1. Lateral ribs evanescent towards apex; leaves ovate, less than 6 cm long .... ***P. wightii***
1. Lateral ribs continued into apex; leaves lanceolate, more than 10 cm long ...... ***P. melastomoides***

618. Pilea melastomoides (Poir.) Blume, Mus. Bot. Lugd.-Bat. 2: 54. 1856; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 246.1987. *Urtica melastomoides* Poir. in Lam., Encycl. Suppl. 4: 223. 1816. *Pilea trinervia* (Roxb.) Wight, Ic. t. 1973. 1853; Hook. f., Fl. Brit. India 5: 557. 1888; Gamble, Fl. Pres. Madras 1379 (964). 1928; Fyson, Fl. South Indian Hill St. 3: t. 506. 1920. *Urtica trinervia* Roxb., Fl. Ind. 3: 582. 1832. **(PLATE 68: 589)**

Common names: Narali (M).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Dioecious subshrubs, glabrous. Leaves to 19 x 9 cm, ovate, acuminate, rounded at base, serrate, 3-ribbed, nervules parallel, pubescent along nervules below; lineoles crowded; petiole unequal in opposite pairs, to 10 cm long. Male panicle 10 cm across, axillary; flowers sessile, 4 mm across; perianth lobes 4, ovate, acute; stamens 4. Female panicle 2 cm across, shortly peduncled. Flowers smaller than male flowers; perianth lobes 1 mm long, stigmas 3-fid. Achenes 1 mm across, biconvex.

Flowering & Fruiting: August - December.

Notes: Found in moist, open slippery rocks, inside sholas ± 2050 m, common in Governor shola.

PSU & NKK, Nanjanad, 13.02.1991, L c 28 (Cairn Hills); KNS, Kundah RF, 12.05.1963, 608 (FRC).

619. Pilea wightii Wedd., Ann. Sci. Nat. Bot. ser. 4, 1: 186. 1854; Hook. f., Fl. Brit. India 5: 455. 1888; Gamble, Fl. Pres. Madras 1379 (964). 1928; Fyson, Fl. South Indian Hill St. 2: t. 237. 1932; V. Chithra in Henry et al., Fl. Tamil

Nadu 2: 247.1987. *Pilea radicans* Wight, Ic. t. 1974. 1853, non Wedd. 1852. **(PLATE 68: 590)**

Common names: Valiyanarali (M).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Slender herbs, glabrous. Leaves 1-3 x 1-2 cm, broadly ovate to suborbicular, acute, subcordate at base, crenate, 3-ribbed; petiole 2-4 cm long. Female cymes 1-2 cm across, shortly peduncled, branches pink; perianth lobes curved, smooth. Achenes 0.5 x 0.5 mm, biconvex, smooth or tubercled.

Flowering & Fruiting: October - December.

Notes: Found in shady, open shola floor ± 2100 m, common in Sispara.

KNS, Kundah RF, 12.05.1963, 607 (FRC).

POUZOLZIA Gaud.

1. Infloresence a terminal leafy spike, upper leaves reduced to floral bracts .... ***P. wightii***
1. Infloresence on axillary cluster or a panicle, upper leaves not reduced into floral bracts .... ***P. bennettiana***

620. Pouzolzia bennettiana Wight, Ic. t. 1978. 1853, var. **bennettiana**; Hook. f., Fl. Brit. India 5: 585. 1888; Gamble, Fl. Pres. Madras 1384 (968). 1928; Fyson, Fl. South Indian Hill St. 2: t. 239. 1932; Chithra in Henry et al., Fl. Tamil Nadu 2: 248.1987. **(PLATE 68: 591)**

Distribution: Peninsular India and Sri Lanka. *Habitat*: Shola border.

Subshrubs, upto 3 m tall; tender parts pubescent. Leaves opposite or ternate, elliptic-obovate to lanceolate, 7-15 x 2-4 cm, 3-nerved from base, thinly pubescent, base rounded, apex acuminate; petiole to 0.5 cm. Flowers in (sub) sessile, axillary clusters. Male flowers 4 mm across; buds truncate, scabrid-pubescent along the margin without. Tepals 5, ovate-lanceolate, 2 mm, plicate in the middle. Stamens 5; filaments 2 mm; anthers 1 mm. Female flowers 1 mm across. Tepals connate, pubescent, acute. Ovary obovoid, 1 mm; style linear, 1.5 mm, hairy. Achene obovoid, winged.

Flowering & Fruiting: January - March.

Utility: Used in Folk medicine. The leaves are eaten as a vegetable and they are considered to possess stomachic properties. An infusion of roots is used for haemorrhage.

Notes: Found in rocky, moist localities of grasslands ± 2100 m, common in Ankinta.

PSU & NKK, Gethai, 10.03.1992, 503; Kodanad, 20.07.1994, 367 & 25.11.1994, 249 (TNFDH).

621. Pouzolzia wightii Bennett, Pl. Jav. Rar. 1: 66. 1838, var. **wightii** Wight, Ic. t. 2093. f. 8. 1853; Hook. f., Fl. Brit. India 5: 584. 1888; Fyson, Fl. South Indian Hill St. 3: t. 509. 1920; Gamble, Fl. Pres. Madras 1383 (967). 1928; Chithra in Henry et al., Fl. Tamil Nadu 2: 248.1987. **(PLATE 68: 592)**

Common names: Parakozhuppa (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Herbs; stem pilose. Leaves to 6.5 x 2.5 cm, ovate to elliptic, acuminate, 3-ribbed, hispid; stipule 8 x 6 mm, ovate. Spike to 35 cm long, terminal; bracts 12 x 8 mm, ovate, cordate at base. Flowers 3-6 together in the axils of bracts. Male and female flowers mixed. Male flowers hemispherical, truncate above, shortly pedicelled; perianth lobes 4, 2.5 mm long, ciliate; filaments puberulus. Female flowers sessile; perianth tube striate, hispid. Achenes 1.5 x 1 mm, ovoid, wingless.

Flowering & Fruiting: December - March.

Notes: Found in rocky slopes of grasslands ± 1800 m, common in Naduvattam.

PROCRIS Cam. ex Juss.

622. Procris crenata Robins., Philipp. J. Sci. 5: 507. 1911; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 249.1987. *Procris wightiana* Wall. ex Wedd., Monogr. Urtic. 336. 1856; Gamble, Fl. Pres. Madras 1378 (963). 1928. *Procris laevigata* sensu Hook.f., Fl. Brit. India 5: 575. 1888, non Blume 1825-1826. **(PLATE 68: 593)**

Common names: Parampu, Tambu (M).

Distribution: Indo-Malesia and Africa. *Habitat*: Shola border.

Succulent herbs, usually epiphytic, stem erect or scandent. Leaves to 8 x 2.5 cm, elliptic-lanceolate, crenate, penninerved, cystolith linear; petiole 3 mm long; lower part of the stem with small orbicular nanophylls. Flowers monoecious, in axils of leaf scars; male flowers in small cymes; female flowers in peduncled receptacle; male perianth lobes 5, free, fleshy; female perianth lobes 3-5, free, fleshy, cucullate; stamens 5; ovary 1-celled, ovoid; ovule 1, basal; stigma sessile, globose. Achenes 1 mm long, ovoid, apiculate, rugose.

Flowering & Fruiting: October - January.

Notes: Found in moist, shady places of sholas ± 2000 m, common in Parson's valley.

URTICA L.

623. Urtica dioica L., Sp. Pl. 984. 1753; Hook.f., Fl. Brit. India 5: 548. 1888. **(PLATE 68: 594)**

Distribution: India, China, Pakistan and Nepal. In India: North west Himalaya and Tamil Nadu. *Habitat*: Roadsides.

Perennial herbs. Stems ascending, grooved, 45-70 cm high, with stining hairs. Leaves ovate-lanceolate to oblong, 3-6 x 1.5-3.5 cm subcordate to truncate at base, acuminate at apex, crenate-serrate at margin, glabrous or sparsely pubescent beneath. Stupules free, ovate-lanceolate. Flowers dioecious, in cymes, which are combined into a second paniculiform inflorescence. Tepals 4, oblong, obtuse, hairy. Achenes sub-orbucular-ovate, compressed.

Flowering & Fruiting: June - September.

Utility: Used in Ayurveda and Homeopathy medicine.

Notes: Found in wastelands and road sides ± 2100 m, common in Ooty town.

105. VACCINIACEAE

VACCINIUM L.

1. Flowers white, pubescent, in axillary racemes .... ***V. neilgherrense***
1. Flowers, pink, in axillary and terminal, racemose panicles .... ***V. leschenaultii***

624. Vaccinium leschenaultii Wight, Ic. t. 1188. 1848, var. **leschenaultii**; Hook. f., Fl. Brit. India 3: 455. 1882; Gamble, Fl. Pres. Madras 742 (521). 1921; Fyson, Fl. South Indian Hill St. 2: t. 178. 1932; R. Rajan in Henry et al., Fl. Tamil Nadu 2: 57.1987. **(PLATE 69: 595, 595a)**

Common names: Anduvan (K); Kalavu, Kelamaram (M); Anduvan, Kalavu (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Trees, to 7 m high; bark thin, greyish-brown; branchlets slender. Leaves simple, alternate, estipulate; petiole 3-10 mm slender, glabrous; lamina 2.5-6.5 x 1-3 cm, ovate, elliptic or elliptic-obovate, base attenuate, acute or obtuse, apex acute or

acuminate, margin serrate, glabrous, coriaceous. Flowers bisexual, pink, in axillary and terminal, racemose panicles; pedicel 3 mm long; bracts cauducous, 2 mm long, calyx tube ovoid, adnate to ovary, 5 teethed, ciliate; corolla urceolate; tube 6-8 mm long; lobes 5; stamens 10, free; anthers produced at the apex into 2 cylindric tubes; ovary inferior, 5-celled, ovules many; style stout; stigma 5 lobed. Fruit a berry, 7-13 mm across, smooth, globose, glabrous, red; seeds pale brown.

Flowering & Fruiting: February - April.

Propagation: Seeds are viable for one week. Fresh fruits are crushed and seed coats were removed, seeds are separated and dried on open sunlight for one day and sown over a mother beds. 80% germination was noticed between 28 and 35 days.

Notes: A typical shola tree ± 2050 m, common in Pykara. Fruits are edible.

PSU & NKK, Kodanad, 02.09.1994, 105 & 04.11.1994, 226 (TNFDH); KNS, Longwood, 21.04.1964, 1206 (FRC).

625. Vaccinium neilgherrense Wight, Calcutta J. Nat. Hist. 8:173.1847 & Ic. t. 1189. 1848; Hook. f., Fl. Brit. India 3: 454. 1882, "nilgherrense"; Gamble, Fl. Pres. Madras 741 (521). 1921; Fyson, Fl. South Indian Hill St. 3: t. 407. 1920; R. Rajan in Henry et al., Fl. Tamil Nadu 2: 58.1987. **(PLATE 69: 596)**

Common names: Hollenugu (K); Manalamaram (M); Kalavu, Kila, Vanji (T).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola forests.

Small trees; bark thin, greyish-brown, wood reddish-brown; branchlets drooping. Leaves to 9 x 1.5 cm, lanceolate, acuminate-acute at both ends, glabrous, subsessile; bracts leaf like, persistent; nerves very oblique. Flowers in lax racemes, 10 mm long. Calyx tube glabrous, lobes ovate, ciliate. Corolla white, glabrous, lobes ovate, spreading; filaments tomentose. Berry globose, 0.5 cm across, red when ripe.

Flowering & Fruiting: February - April.

Propagation: Seeds are viable for 15 days. Fresh fruits are collected from matured healthy trees. Fruits are crushed and depulped; seeds are separated and dried for one day in sunlight. The dried seeds are broadcasted over well prepared mother beds. 60 % germination noticed from 20 to 35 days.

Notes: A typical shola tree ± 2000 m, common in Sispara. Fruits are edible.

PSU & NKK, Wenlockdowns, 27.02.1991, b 24 (Cairn Hills); PSU & NKK, Kodanad, 20.07.1994, 104 (TNFDH).

106. VALERIANACEAE

VALERIANA L.

1. Leaves simple or with sometimes one or two small leaflets below the end one; flowers pink .... *V. leschenaultii*
1. Leaves cauline; stem elongate; flowers white 2

2. Leaves radical; stem condensed .... *V. hookeriana*
2. Leaves cauline; stem elongate .... *V. hardwickii* var. *arnottiana*

626. Valeriana hardwickii Wall. var. **arnottiana** (Wight) Clarke in Hook.f., Fl. Brit. India 3: 213. 1880; Manilal, Fl. Silent Valley 145. 1988. *Valeriana arnottiana* Wight, Ic. t. 1045-6. 1845; Gamble, Fl. Pres. Madras 657 (463). 1921; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 27.1987. **(PLATE 69: 597)**

Common names: Indian Valerian (E).

Distribution: India and Pakistan. *Habitat*: Grasslands.

Caulescent, erect herbs; stem ribbed and hollow. Leaves cauline, decussate, pinnate, chartaceous; petiole to 4 cm; leaflets 5-9, lower ones alternate, ovate, to 6 x 4 cm, base cuneate-truncate, margin serrate-dentate, apex acuminate; petiolule to 15 mm. Cymes diffuse, 16 x 11 cm; peduncle to 15 cm; bracts to 10 mm. Calyx-limbs more than 10. Corolla white, 5 mm wide; lobes 5, broadly ovate. Stamens 3. Ovary 1-celled; ovule 1. Achene 3.5 mm.

Flowering & Fruiting: May - November.

Utility: Used in Ayurveda and Unani medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Ankinda.

627. Valeriana hookeriana Wight & Arn., Prodr. 444.1834; Hook. f., Fl. Brit. India 3:214.1881; Gamble, Fl. Pres. Madras 657 (463). 1921; Fyson, Fl. South Indian Hill St. 2: t. 145. 1932; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 27.1987. *Valeriana beddomei* Clarke in Hook.f., Fl. Brit. India 3: 214. 1881; Gamble, Fl. Pres. Madras 657 (463). 1921. **(PLATE 69: 598)**

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Cauline herbs. Leaves radical, pinnatifid; petiole canaliculate, to 17 cm; leaflets 7-12 pairs, (sub) opposite, lower ones linear to elliptic, 0.5-2(4) x 0.2-0.8 cm, upper ones

broadly lanceolate, 3-5 x 1-2.5 cm; margin bluntly toothed, apex acute. Cymes terminal, 5 x 2.5 cm; peduncles to 30 cm. Calyx-limbs more than 10. Corolla rose to pinkish, to 4 mm wide; lobes 5(6), ovate. Stamens 3. Ovary 1-celled; ovule 1. Achene 3 mm.

Flowering & Fruiting: February - April.

Notes: Found in the ecotone region of sholas ± 2100 m, common in Mukurthi.

628. Valeriana leschenaultii DC., Prodr. 4: 640. 1830; Hook. f., Fl. Brit. India 3: 214. 1881, incl. var. *brunoniana*; Gamble, Fl. Pres. Madras 657 (463). 1921; Fyson, Fl. South Indian Hill St. 2: t. 146. 1932; V. Chithra in Henry et al., Fl. Tamil Nadu 2: 27.1987.

Distribution: Endemic to Southern Western Ghats. *Habitat*: Grasslands.

Erect perennial herbs, up to 1 m tall; stem without hairs, simple or sparingly branched, many ribbed, hollow inside. Leaves opposite, dimorphic: lower leaves simple, ovoid-shaped-lanceolate, about 15 x 10 cm, base cordate, apex acute, margin entire or slightly wavy, sparingly pubescent; petiole 5-15 cm long; upper leaves smaller, oblanceolate, about 7 x 3 cm, occasionally lobed, with short petiole. Flowers pink, bisexual, numerous, minute, about 5 mm across, very shortly stalked, in terminal branched corymbose cymes. Calyx limb small, involute. Corolla tube funnel-shaped, lobes 5, spreading. Stamens 3; ovary 3-celled, 1-ovuled. Achenes oblong, about 4 mm long, compressed, glabrous, 4-6 ribbed, crowned with feathery hairs at apex.

Flowering & Fruiting: September - December.

Utility: Used in Folk medicine.

Notes: Found in the ecotone region of sholas ± 2050 m, common in Pykara. The Red listed status of this species is Critically Endangered for Karnataka, Kerala and Tamil Nadu.

KNS, Naduvattam, 13.05.1963, 271(FRC).

107. VERBENACEAE

1. Plants shrubs, flowers in elongate, terminal cymose panicles, bluish-white .... ***Rotheca***
1. Plants erect herbs, flowers in terminal spikes, in triads, violet .... ***Verbena***

ROTHECA Raf.

629. Rotheca serrata (L.) Steane & Mabb., Novon 8: 206. 1998. *Volkameria serrata* L., Mant. Pl. 1: 90. 1767. *Clerodendrum serratum* (L.) Moon, Cat. Pl. Ceylon 46. n.382. 1824; Hook. f., Fl. Brit. India 4: 592. 1885; Gamble, Fl. Pres. Madras 1100 (770). 1924; Fyson, Fl. South Indian Hill St. 3: t. 458. 1920; S.R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 165.1987. *Cyclonema serratum* (L.) Hochst., Flora 25: 227. 1842. **(PLATE 69: 599)**

Common names: Blue flowered glory tree, Beetle killer (E); Bharangi, Velikkuty, Gungurada hoovu, Nirvisha (K); Cheruthekku, Kankabharnni, Kantani, Kattuppadappa, Kurukkutti, Napalu, Perikilam (M); Angaravalli, Chirudekku (T).

Distribution: India, Nepal, Myanmar and Sri Lanka. *Habitat*: Grasslands.

Shrubs to 2 m tall; stems and branches purplish, obtusely tetragonous. Leaves 8-22 x 5-14 cm, broadly elliptic-ovate or obovate, base attenuate to acute, margin coarsely serrate, apex acuminate, glabrous above and pubescent along the nerves below, thin-coriaceous; petiole to 1 cm long. Inflorescence elongate, terminal cymose panicles, 16-28 cm long, pubescent. Bracts ternate, 0.8-1.5 x 0.3-1 cm, ovate-lanceolate. Calyx 5-6 mm long, ca 5 mm across, cup-shaped, teeth ciliate. Corolla bluish; tube 0.8-1.2 cm long; lobes spreading, 2-lipped, 0.8-1 x 0.5 - 0.7 cm, unequal, oblong. Stamens 4; filaments 2-2.5 mm long, exerted. Ovary ca 2.5 mm across, globose. Drupe 4-lobed, 0.8-1.2 cm across, subglobose, dark-purple. Seeds 2-4, 4-5 mm across, globose.

Flowering & Fruiting: August - December.

Utility: Used in Ayurveda, Folk, Siddha, Tibetain and Unani medicine. Root is used in asthma, bronchitis, abdominal disorders, epilepsy, indigestion, respiratory diseases, burning sensation, snakebite and intermittent fever.

Notes: Found in all types of forests, seen along the edges of grasslands and sholas ± 1800 m, common in Naduvattam.

KNS, Nilgiris, 15.05.1963, 695 (FRC).

VERBENA L.

630. Verbena bonariensis L., Sp. Pl. 20 .1753; Gamble, Fl. Pres. Madras 1106 (774). 1928; S.R. Srinivas. in Henry et al., Fl. Tamil Nadu 2: 169.1987; Fyson, Fl. South Indian Hill St. 2: t. 214. 1932; Rajendran & Daniel, The Indian Verbenaceae 331. 2002. **(PLATE 69: 600)**

Common names: Purpletop Vervain, Tall Verbena, Clustertop Vervain, Pretty Verbena (E).

Distribution: Native of South America. *Habitat*: Grasslands.

Undershrubs or herbs; stem and branches acutely 4-angular, scabrid to hispid, or hirsute. Leaves opposite, sessile, 4-16 x 0.8-2.5 cm, oblong or narrow-lanceolate to ovate-lanceolate, semiamplexicaul at base, coarsely serrate along margins, acute at apex, coriaceous, rugose hirtellous above. Spikes terminal, fasciculate, in triads; bracts oblong or lanceolate, acuminate at apex; bractlets linear. Calyx tubular, shortly 5-toothed; teeth subequal. Corolla hypocrateriform, 5-lobed, purple or bluish pink. Stamens 4, didynamous. Ovary oblong, 4-lobed; style stout, glabrous; stigma subcapitate, spurred at base. Schizocarps oblong, splitting into 4 cylindric cocci, 3-gonous, slightly raised-reticulate on dorsal side, brown, enclosed by persistent calyx.

Flowering & Fruiting: June - December.

Notes: Naturalised in grasslands and open areas ± 2050 m, common in Pykara.

PSU & NKK, Wenlockdowns, 27.01.1991, c 74 (Cairn Hills); PSU & NKK, Kodanad, 20.09.1994, 580 (TNFDH).

108. VIOLACEAE

VIOLA L.

1. Prostrate herbs, rooting at nodes .... *V. pilosa*
1. Plants erect herbs 2

2. Leaves cauline, triangular-ovate, base decurrent to the petiole .... *V. betonicifolia*
2. Leaves radical, ovate, cordate at base, crenate .... *V. hamiltoniana*

631. Viola betonicifolia J.E. Smith in Rees, Cyclop. 37: n.7. 1817; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 14. 1983 & in B.D. Sharma & N.P. Balakr., Fl. India 2: 355. 1993. *Viola betonicifolia* J. E. Smith ssp. *nepalensis* (Ging.) Becker in Engl., Bot. Jahrb. Syst. 54: Beibl. 120,166. 1917; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 16.1983. *Viola patrinii* DC. var. *nepalensis* Ging. in DC., Prodr. 1: 293. 1824. *Viola patrinii* sensu Hook.f. & Thoms. in Hook.f., Fl. Brit. India 1: 183. 1872; Gamble, Fl. Pres. Madras 48 (35). 1915; Fyson, Fl. South Indian Hill St. 2: t. 17. 1932, non Ging. 1824. *Viola walkeri* Wight, Illustr. 1: 42. t. 18. 1840. **(PLATE 69: 601)**

Distribution: Indo-Malesia to Australia. *Habitat*: Grasslands.

Stemless herbs. Leaves cauline, 4 x 1.5 cm, triangular, ovate, acute, serrate, base decurrent to the petiole, puberulus; petiole to 7 cm; stipule to 7 mm. Flowers axillary, solitary, white; pedicels to 20 cm; sepals 3 mm, lanceolate; lower petals pouched at base, 1.2 x 4 mm; anthers connate; ovary 2.5 mm, style 1.5 mm, stigma terminal. Capsule 1-celled; seeds many.

Flowering & Fruiting: January - June.

Utility: Used in Folk medicine.

Notes: Found in moist, shady places of sholas ± 2100 m, common in Mukurthi.

632. Viola hamiltoniana D. Don, Prodr. Fl. Nepal. 206. 1825; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 23. 1983 & in B.D. Sharma & N.P. Balakr., Fl. India 2: 363. 1993. *Viola arcuata* Blume, Bijdr. 58. 1825. *Viola distans* Wall., Trans. Med. Soc. Calcutta 7: 227. 1885; Hook. f., Fl. Brit. India 1: 183. 1872; Gamble, Fl. Pres. Madras 48 (35). 1915; Fyson, Fl. South Indian Hill St. 2: t. 18. 1932.

Distribution: Indo-Malesia. *Habitat*: Grasslands.

Herbs; stem very short or absent. Leaves radical, 4.5 x 5.5 cm, ovate, acute at apex, cordate at base, crenate; petiole to 15 cm long, slender. Flowers axillary, solitary, long-pedicelled; pedicel 15-18 cm long; sepals ovate, 6 mm long, glandular, serrate; petals white, lower petals 11 x 5 cm, spurred at base; other petals smaller, obovate, obtuse; stamens 5, anthers connate, lowers two anthers with spurred connectives; filaments broad; ovary 1-celled, ovules many, parietal; style 1. Capsule 5 x 3 mm, ampulliform, glabrous; seeds, many, black, rugose.

Flowering & Fruiting: October - March.

Notes: Found in moist, shady places of sholas ± 2100 m, common in Mukurthi.

PSU & NKK, Wenlockdowns, 27.01.1991, b 29 (Cairn Hills); KNS, Bandy shola, 11.05.1963, 561(FRC).

633. Viola pilosa Blume, Cat. Gew. Buitenz. 57. 1823; V. Chithra in N.C. Nair & A.N. Henry., Fl. Tamil Nadu 1: 17.1983; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 30. 1983 & in B.D. Sharma & N.P. Balakr., Fl. India 2: 371. 1993. *Viola serpens* Wall. ex Ging. in DC., Prodr. 1: 296. 1824; Hook. f., Fl. Brit. India 1: 184. 1872; Gamble, Fl. Pres. Madras 48 (35). 1915; Fyson, Fl. South Indian Hill St. 2: t. 19. 1932. *Viola wightiana* Wall. ex Wight, Ic. t. 943. 1845. **(PLATE 69: 602)**

Distribution: Indo-Malesia and China. *Habitat*: Shola forests.

Prostrate herbs, rooting at nodes. Leaves mostly alternate, 3.5-6 x 3.5-6 cm, ovate, base deeply cordate, hirsute, apex acute, crenate; petiole to 15 cm, hairy, stipules foliaceous, 1 cm. Flowers solitary, white; pedicels to 10 cm, hairy; sepals 7 mm, lower lanceolate, hairy; petals 1 cm, subequal, longer one obovate, spurred at the base, 6 mm; anthers 2 mm, oblong, connective produced above; ovary 2 mm, ovoid, puberulus, style 2 mm, stigma lateral.

Flowering & Fruiting: January - April.

Notes: Found in moist, shady places of sholas ± 2050 m, common in Pykara.

Utility: Used in Folk medicine.

PSU & NKK, Glenmorgan, 26.01.1991, b 30 (Cairn Hills); PSU & NKK, Kodanad, 30.09.1994, 180 (TNFDH); KNS, Longwood, 08.05.1963, 473 (FRC).

109. VISCACEAE

1. Plants leafy, branchlets terete .... *Viscum*
1. Plants leafless, stems flattened .... *Korthalsella*

KORTHALSELLA Tieghem.

634. Korthalsella japonica (Thunb.) Engl. in Engl. & Prantl, Naturl. Pflanzenfam. 1: 138. 1897; Gamble, Fl. Pres. Madras 1256 (879). 1925; Fyson, Fl. South Indian Hill St. 3: t. 486. 1920. *Viscum japonicum* Thunb., Trans. Linn. Soc. London 2: 329. 1794; Hook. f., Fl. Brit. India 5: 226. 1886. **(PLATE 70: 603)**

Distribution: India, China, Mauritius and Australia. *Habitat*: Epiphytic on *Litsea*.

Tufted parasitic herbs, stems flattened, jointed, green, glabrous. Leaves absent. Flowers unisexual, membranous, minute, fascicled, at the tips of the inter node, sessile; perianth lobes 3, persistent; stamens 3; anthers 2-celled; ovary obovoid, 1-celled, placenta central; style absent; stigma minute. Fruit an obovoid, fleshy berry, to 3 mm across.

Flowering & Fruiting: October - December.

Notes: Parasites on shola trees ± 1800 m, common in Naduvattam.

PSU & NKK, Wenlockdowns, 27.01.1991, d 70 (Cairn Hills).

VISCUM L.

635. Viscum heyneanum DC., Prodr. 4: 278. 1830; V. Chandras. in Henry et al., Fl. Tamil Nadu 2: 218.1987. *Viscum verruculosum* Wight & Arn., Prodr. 379. 1834; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258 (881). 1925. *Viscum orbiculatum* Wight, Ic. t. 1016. 1845; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258 (880). 1925; Fyson, Fl. South Indian Hill St. 3: t. 487. 1920. **(PLATE 70: 604)**

Distribution: India and Sri Lanka. *Habitat*: Epiphytic on *Michelia*.

Parasitic herbs; branchlets terete, suberect. Leaves 3-4 x 1-2 cm, ovate-lanceolate, apex obtuse or rounded, base acute, 3-5 ribbed, glandular, narrowing into a small petiole. Cymes pedunculate; peduncles 5 mm long, 3-flowered, 3-8 in the axils, slender. Flowers in each triad all male, all female, or middle one female and laterals male, sessile. Berry 5 x 2 mm, ellipsoid, acute.

Flowering & Fruiting: June - September.

Utility: Used in medicine.

Notes: Parasites on shola trees ± 1800 m, common in Naduvattam.

PSU & NKK, Kodanad, 20.09.1995, 330 (TNFDH).

110. VITACEAE

1. Flowers in axillary dense corymbs, greenish white .... *Cayratia*
1. Flowers in short axillary cymes, white .... *Tetrastigma*

CAYRATIA A. Juss.

636. Cayratia pedata (Lam.) A. Juss. ex Gagnep. var. **glabra** Gamble, Fl. Pres. Madras 236 (169). 1918; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 80.1983; Shetty & P. Singh in N.P. Singh et al., Fl. India 5: 272. 2000. **(PLATE 70: 605)**

Common names: Kaama patige balli, Kadu drakshi, Narale balli (K); Velutha-sori-valli (M).

Distribution: Endemic to Southern Western Ghats. *Habitat*: Shola border.

Weak-stemmed vines; young stem, petioles, tendrils and peduncles densely pubescent. Leaves pedately 5-7-foliolate; leaflets 5-13 x 3-6 cm, lanceolate to obovate, base

cuneate, that of laterals usually oblique, margin subentire or serrate, apex acuminate, pubescent, membranous; petiole to 9 cm long; petiolules 0.5-2 cm long. Flowers in axillary dense corymbs; peduncles 2-3.5 cm long; pedicels 3-4 mm long. Calyx cupular, 1-2 mm long, margin irregularly 4-lobed. Petals 4, 1.5-2 mm long, ovate-acute, greenish white, reflexed, apices hooded. Disk creamy white. Stamens 4, attached to the disc. Ovary ca 1 mm, 2-celled; ovules 2 in each cell; style subulate. Berry 0.5-1 cm across, depressed-globose, creamy white. Seeds 1-4, hemispherical, flattened ventrally.

Flowering & Fruiting: March - August.

Utility: Used in Folk medicine.

Notes: Climbing on shola trees ± 1800 m, common in Naduvattam. Red listed status of this endemic species is **Critically Endangered** for Karnataka, Kerala and Tamil Nadu.

TETRASTIGMA (Miq.) Planch.

637. Tetrastigma leucostaphylum (Dennst.) Alston ex Mabb., Taxon 26: 539. 1977; K. Ramam. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 82.1983; Shetty & P. Singh in N.P. Singh et al., Fl. India 5: 314. 2000. *Cissus leucostaphyla* Dennst., Schluss. Hort. Malab. 17,19,33. 1818. *Tetrastigma muricatum* (Wall. ex Wight & Arn.) Gamble, Fl. Pres. Madras 229 (164). 1918; Fyson, Fl. South Indian Hill. St. 3: t. 307.1920. *Tetrastigma lanceolarium* (Roxb.) Planch. in A. & C. DC., Monogr. Phan. 5: 423. 1887; Gamble, Fl. Pres. Madras 228 (164). 1918. *Vitis muricata* Wall. ex Wight & Arn., Prodr. 128. 1834. *Vitis lanceolaria* sensu Lawson in Hook. f., Fl. Brit. India 1: 660. 1875p.p., non Wall. 1831-32. **(PLATE 70: 606)**

Common names: Kadu drakshi (K); Seenkaikkodi (M).

Distribution: Indo-Malesia. *Habitat*: Shola border.

Woody scandent shrubs; stems strongly verrucose with elongated lenticels; tendril simple, woody with age. Leaves pedately 5-foliolate, trifoliolate or simple, sometimes all three types found on same plant; leaflets 4-13 x 2-6 cm, oblong-lanceolate, base cuneate, margin coarsely serrate, especially distally, apex acute, coriaceous, the laterals unequal sided; petiole to 8 cm long, warty-lenticellate, base swollen; petioules 5-14 mm long. Flowers ca 4 mm across, in short axillary cymes. Calyx lobes 4, ca 1 mm long, more or less ciliolate. Petals 4, white, 1-1.5 mm long, ovate, acute, apically

thickened. Disk lobed. Stamens 4. Ovary subglobose; stigma lobed. Berry ca 1.3 cm across, subglobose, creamy white. Seeds 2-4, oblong, transversely rugose.

Flowering & Fruiting: November - March.

Utility: Used in Folk and Siddha medicine.

Notes: Found in shola border ± 1600 m, common in Thaishola.

PSU & NKK, Outcherloney, 02.02.1991, I b 49 (Cairn Hills); PSU & NKK, Kodanad, 28.08.1995, 307 (TNFDH); KNS, Longwood, 08.05.1963, 495 (FRC).

111. XYRIDACEAE

XYRIS L.

638. Xyris capensis Thunb., Prodr. Pl. Cap. 12. 1794. *Xyris schoenoides* Mart. in Wall., Pl. Asiat. Rar. 3: 30.1832; Hook. f., Fl. Brit. India 6:365.1892; Gamble, Fl. Pres. Madras 1532 (1070). 1928; Fyson, Fl. South Indian Hill St. 2: t. 265. 1932. *Xyris capensis* Thunb. var. *schoenoides* (Mart.) Nilsson, Öfvers. Kongl. Vetensk.-Akad. Förh. 24: 41. 1892; P. Bhargavan in A.N. Henry et al., Fl. Tamil Nadu 3: 42.1989. **(PLATE 70: 607)**

Distribution: Indo-Malesia. *Habitat*: Marshy areas.

Tufted herbs. Leaves all radical, 10-15 x 0.5-0.8 cm, flat, lanceolate, apex acute; scape to 40 cm long. Heads terminal, solitary, ellipsoid, to 1 cm; bracts to 8 mm, orbicular, persistent; outer perianth unequal, deciduous; inner yellow, clawed; stamens 3, filaments to 2 mm; ovary 1 mm, one celled, many ovuled, style tri-fid, stigma papillose.

Flowering & Fruiting: April - June.

Notes: Found in marshy areas of sholas ± 2050 m, common in Pykara.

PSU & NKK, Mukurthi, 29.01.1991, b 6 (Cairn Hills); PSU & NKK, Kodanad, 10.10.1994, 114 & 199 (TNFDH); KNS, Kodanad, 07.05.1963, 431(FRC).

112. ZINGIBERACEAE

1. Anthers winged .... *Globba*
1. Anthers not winged 2

2. Plants small herbs; flowers yellow, anthers spurred basally .... *Curcuma*
2. Plants large herbs; flowers white, Anthers not spurred basally .... *Hedychium*

CURCUMA Roxb.

639. Curcuma neilgherrensis Wight, Ic. t. 2006. 1853; Hook. f., Fl. Brit. India 6: 210. 1892; Gamble, Fl. Pres. Madras 1482 (1036). 1928; Fyson, Fl. South Indian Hill St. 2: t. 259. 1932; K. Ramam. in A.N. Henry et al., Fl. Tamil Nadu 3: 28.1989; Sabu, Zingiberaceae and Costaceae of South India 169. 2006. *Curcuma angustifolia* sensu Dalz. & Gibs., Bombay Fl. 274. 1861, non Roxb. **(PLATE 70: 608, 608 a)**

Common names: Wild arrow root (E); Koova, Vellakkuva, Kattumanjal (M); Kattu-kuvai, Kaattu manjal (T).

Distribution: Endemic to Western Ghats. *Habitat*: Grasslands.

Tuberous herbs. Leaves lanceolate, 24 x 4.5 cm, acuminate at apex, narrowed at base, shortly petioled. Flowers yellow, in dense spikes; fertlie bracts oblong-lanceolate, acute, pale yellowish-green; coma dense, pink. Calyx tube ca 1.5 cm long, 3-toothed. Corolla lobes lanceolate, labellum broadly ovate, apex 2-lobed. Staminodes oblong. Ovary oblong, pubescent. Capsules globose, glabrous.

Flowering & Fruiting: April - October.

Notes: Found in open grasslands ± 2200 m, common in Pykara.

KNS, Ooty to Gudalur, 14.05.1963, 665 (FRC).

GLOBBA L.

640. Globba marantina L., Mant. Pl. 2: 170. 1771; Hook. f., Fl. Brit. India 6: 206. 1890; K. Ramam. in A.N. Henry et al., Fl. Tamil Nadu 3: 28.1989. *Globba bulbifera* Roxb., Asiat. Res. 11: 358. 1810; Hook. f., Fl. Brit. India 6: 206. 1890. *Globba marantinoides* Wight, Ic. 6: 15. t. 2001. 1853. **(PLATE 70: 609)**

Distribution: Indo-Malesia. *Habitat*: Shola border.

Erect rhizomatous herbs; stem to 50 cm high, usually solitary, stem slender. Leaves bifarious, to 20 x 5 cm, oblong-lanceolate, acute at apex, sessile, glabrous. Spike terminal, to 10 cm long, often with bulbils towards the base; bracts 1-2 cm long, broadly ovate, greenish; bracteoles 1 cm long, ovate. Flowers solitary in each bracts; calyx 5 mm long, funnel shaped, 3-lobed; corolla 14 mm long, tube slender, lobes short, yellow; lip as long as the corolla, deeply 2-lobed, yellow; stamen 1, anthers broadly winged; lateral staminodes oblong; ovary 1-celled; ovules many on 3-parietal

placentas; style 1, slender; stigma turbinate. Capsule 1 x 6 mm, oblong, glabrous, coarsely rugose.

Flowering & Fruiting: July - September.

Utility: Used in Folk medicine.

Notes: Found in moist shady places of evergreen forest and rare in shola ± 1800 m, common in Naduvattam.

HEDYCHIUM Koen.

641. Hedychium spicatum Sm. in Rees, Cycl. 17: 8. 1811. *Gandasulium spicatum* (Sm.) Kuntze, Revis. Gen. Pl. 2: 690. 1891. *Hedychium acuminatum* Rosc., Monandr. Pl. t. 47. 1828. *Hedychium spicatum* Ham. ex J.E. Smith var. *acuminatum* (Rosc.) Wall. in Hook.'s J. Bot. Kew Gard. Misc. 5: 328. 1853; Hook. f., Fl. Brit. India 6: 227. 1892; Sabu, Zingiberaceae and Costaceae of South India 202. 2006. *Hedychium spicatum* var. *khasianum* Clarke ex Baker in Hook. f., Fl. Brit. India 6: 227. 1892. **(PLATE 70: 610)**

Distribution: India. *Habitat*: Marshy areas.

Perennial, tuberous rhizomatous herbs. Leafy shoots upto 1 m. Leaves distichous; lamina oblong-lanceolate, glabrous or pubescent. Inflorescence terminal, spike lax or dense flowered. Bracts oblong or convolute round the calyx; each bract subtends a single flower, rarely upto 3 flowers. Bracteoles smaller than the bracts. Flowers longer than the bracts. Calyx tubular, longer than or shorter than the bracts, unilaterally split. Corolla tube long, slender; lobes equal. Labellum deeply lobed, base clawed, pure yellow or white, or with a red blotch at the base. Lateral staminodes linear, tip shortly bifid or entire. Stamen shorter than the labellum; filament red or pale yellow; anther straight or curved. Ovary trilocular, glabrous. Fruit globose.

Flowering & Fruiting: July- November.

Utility: Used in Ayurveda, Folk, Tibetain and Unani medicine.

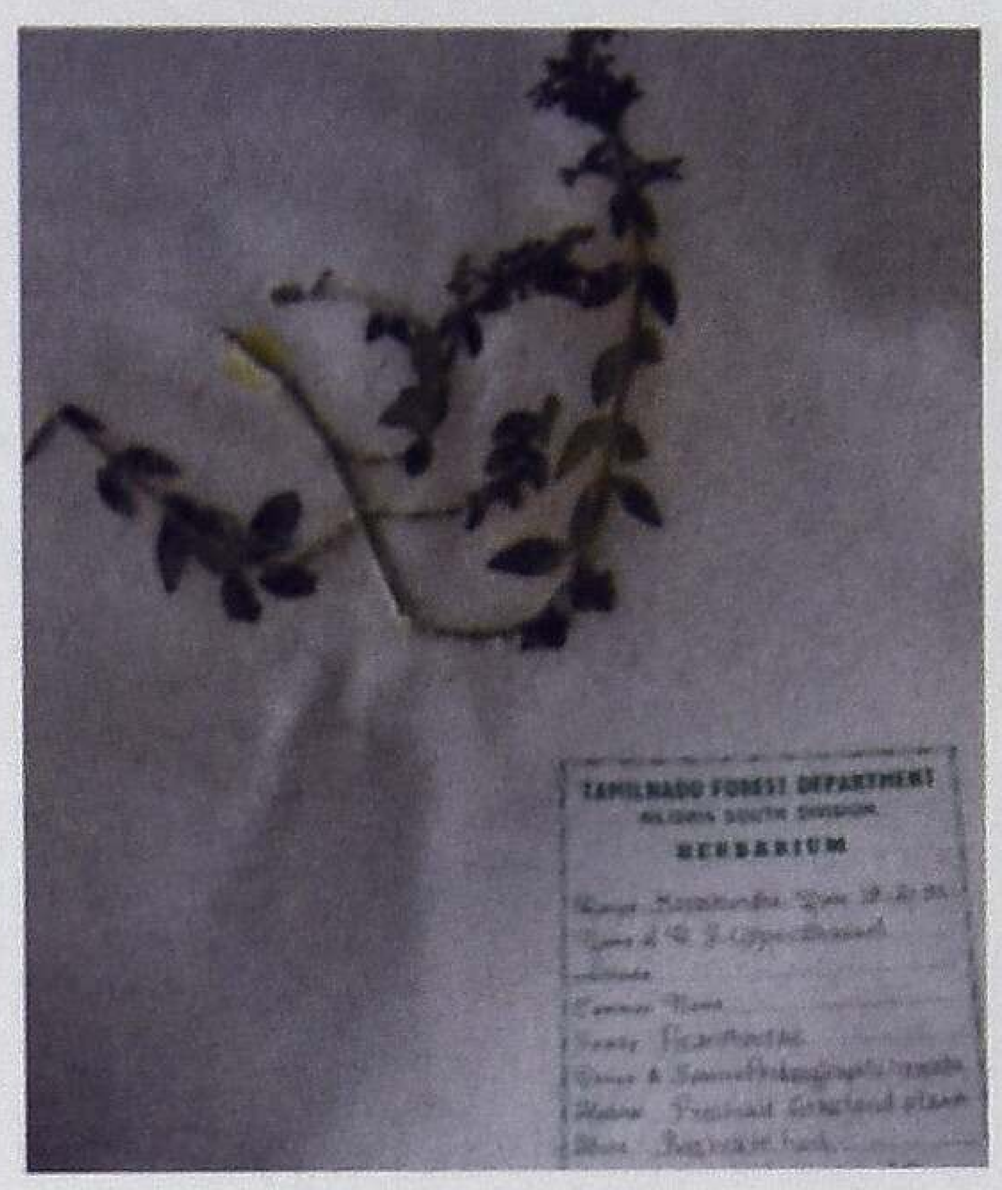
Propagation: Seed germination is below 30%, however it could be enhanced up to 61% by soaking in KNO_3 (50.0 mM) solution for 24 h at 25°C under dark condition. Seed germination starts after 3 weeks of seed sowing and completes by 12 weeks. Seeds can be sown at a depth of 1.5 cm and maintained at 25 ± 2°C in darkness.

Notes: Found in marshy, rocky slopes ± 1100 m, common in Kalhatty.

PSU & NKK, Kodanad, 20.09.1995, 327 (TNFDH).

PLATE 1

1. *Andrographis alata* (Vahl) Nees



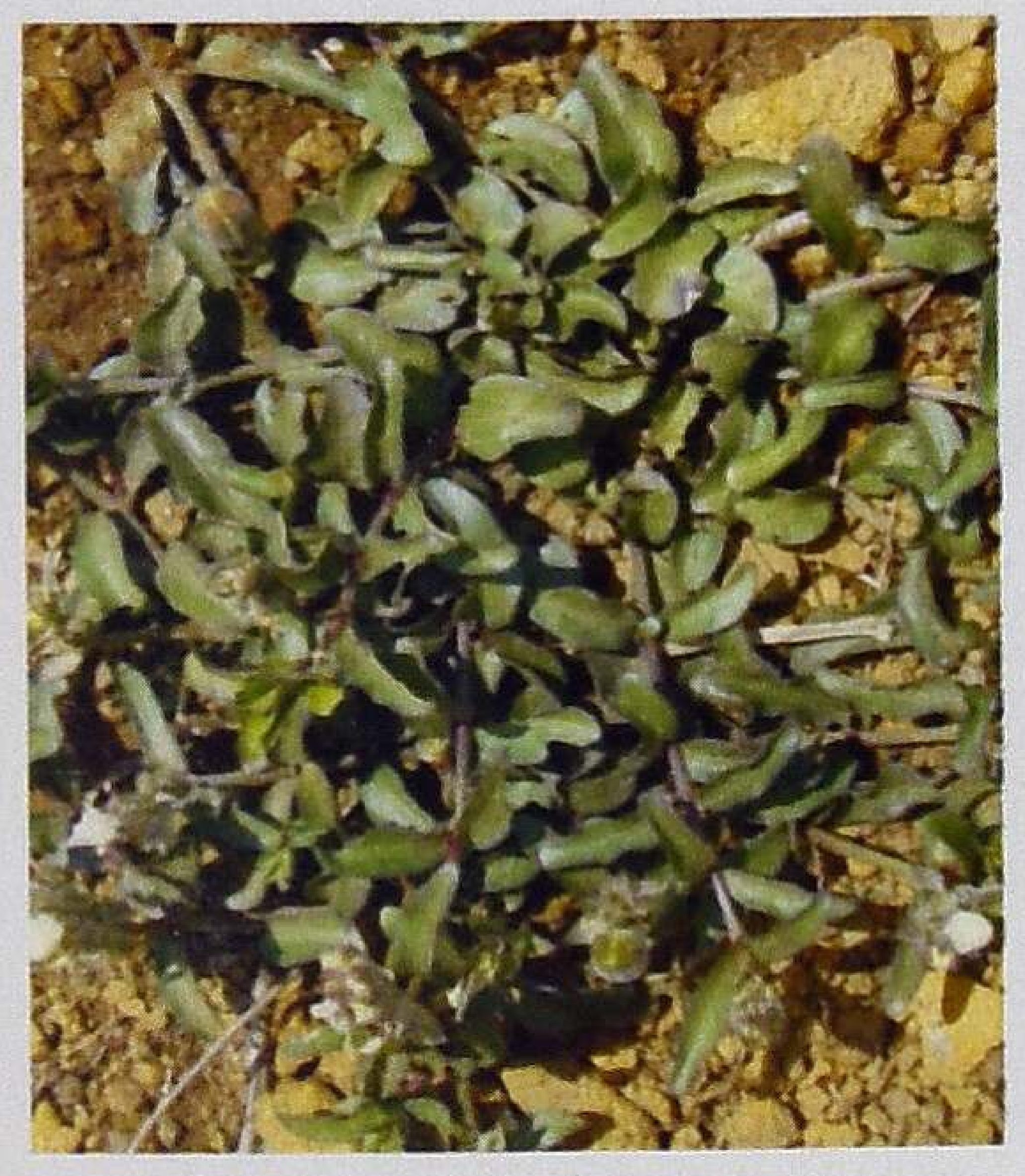
2. *Andrographis lineata* Wall. ex Nees

3. *Andrographis lobelioides* Wight

4. *Asystasia crispata* Benth.

5. *Barleria involucrata* Nees var. *elata* (Dalz.) Clarke

6. *Justicia japonica* Thunb.



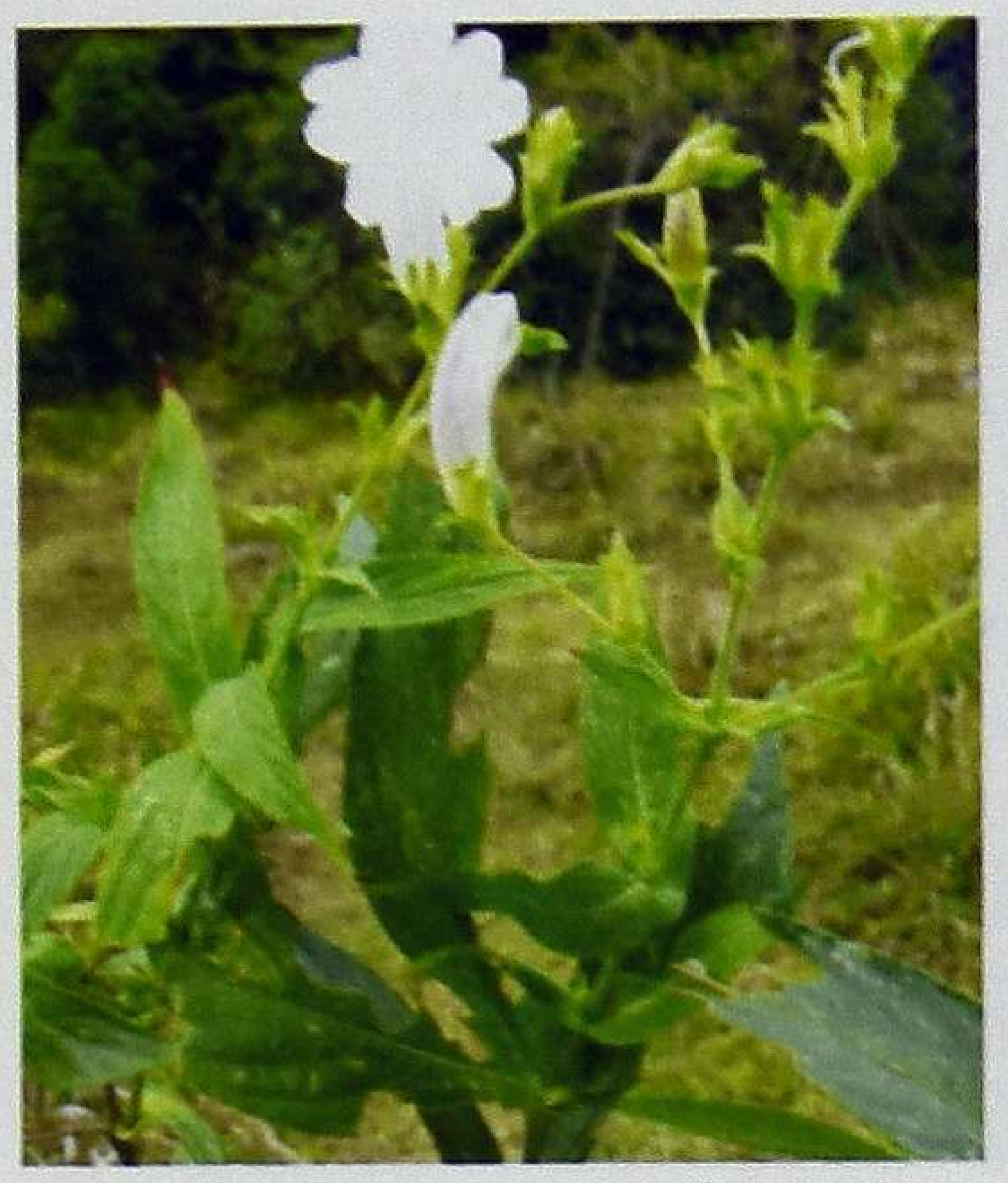
7. *Justicia nilgherrensis* (Nees) Wall. ex Anders.

8. *Strobilanthes barbatus* Nees

9. *Strobilanthes cuspidatus* (Benth.) Anders.

PLATE 2

10. *Strobilanthes foliosus* (Wight) Anders.


11. *Strobilanthes gracilis* Bedd.

12. *Strobilanthes heyneanus* Nees

13. *Strobilanthes homotropus* Nees

14. *Strobilanthes kunthianus* (Nees) Anders. ex. Benth.

15. *Strobilanthes lanatus* Nees

16. *Strobilanthes luridus* Wight

17. *Strobilanthes micranthus* Wight

18. *Strobilanthes neilgherrensis* Bedd.

PLATE 3

19. *Strobilanthes neoasper* Venu & Daniel

20. *Strobilanthes papillosus* Anders.

21. *Strobilanthes pulneyensis* Hook. f.

22. *Strobilanthes sessilis* Nees

23. *Strobilanthes wightianus* Nees

24. *Strobilanthes zenkerianus* Anders.

25. *Thunbergia tomentosa* Wall. ex Nees

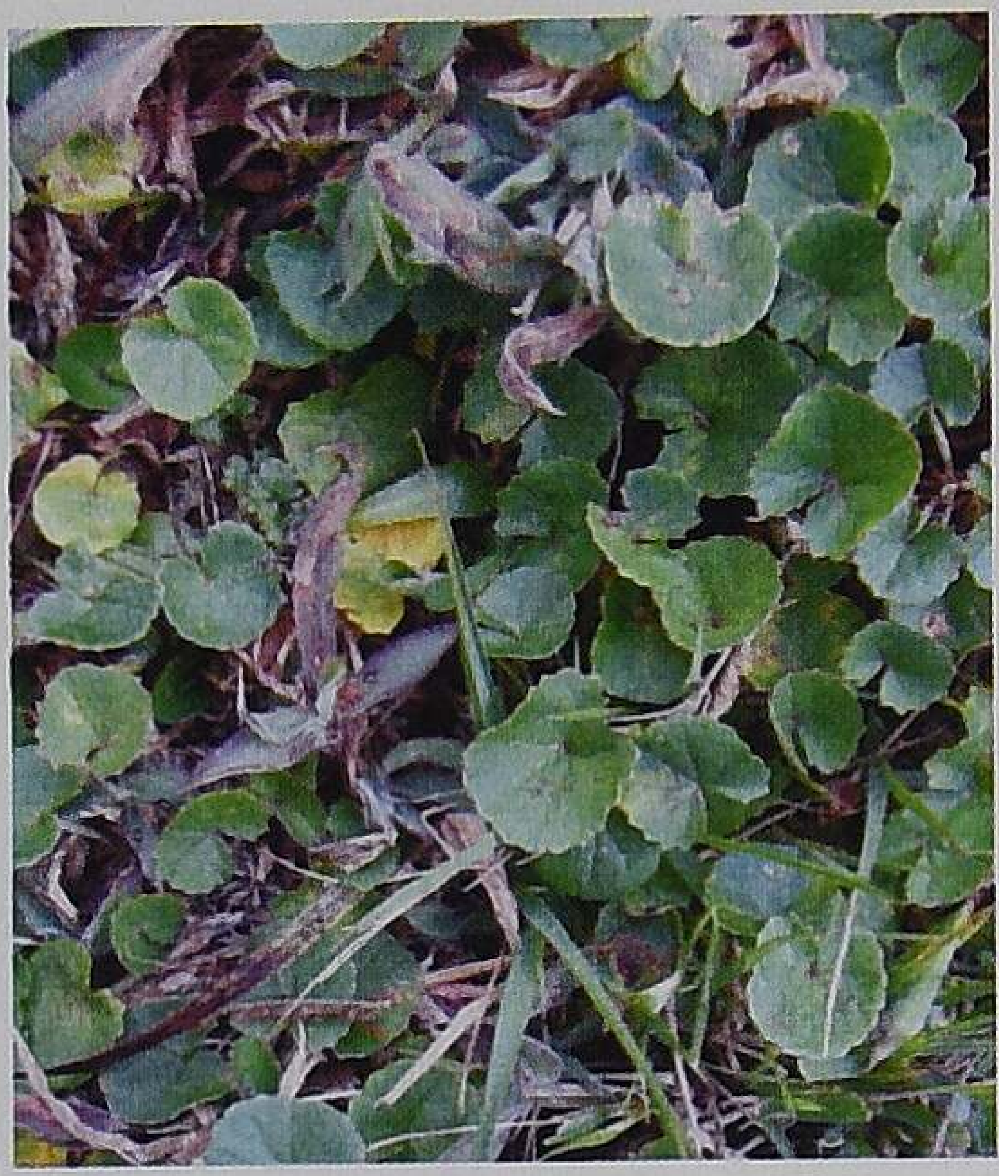
26. *Achyranthes bidentata* Blume

27. *Agapanthus africanus* (L.) Hoffmanns.

PLATE 4

28. *Bupleurum distichophyllum* Wight & Arn.

29. *Bupleurum mucronatum* Wight & Arn.

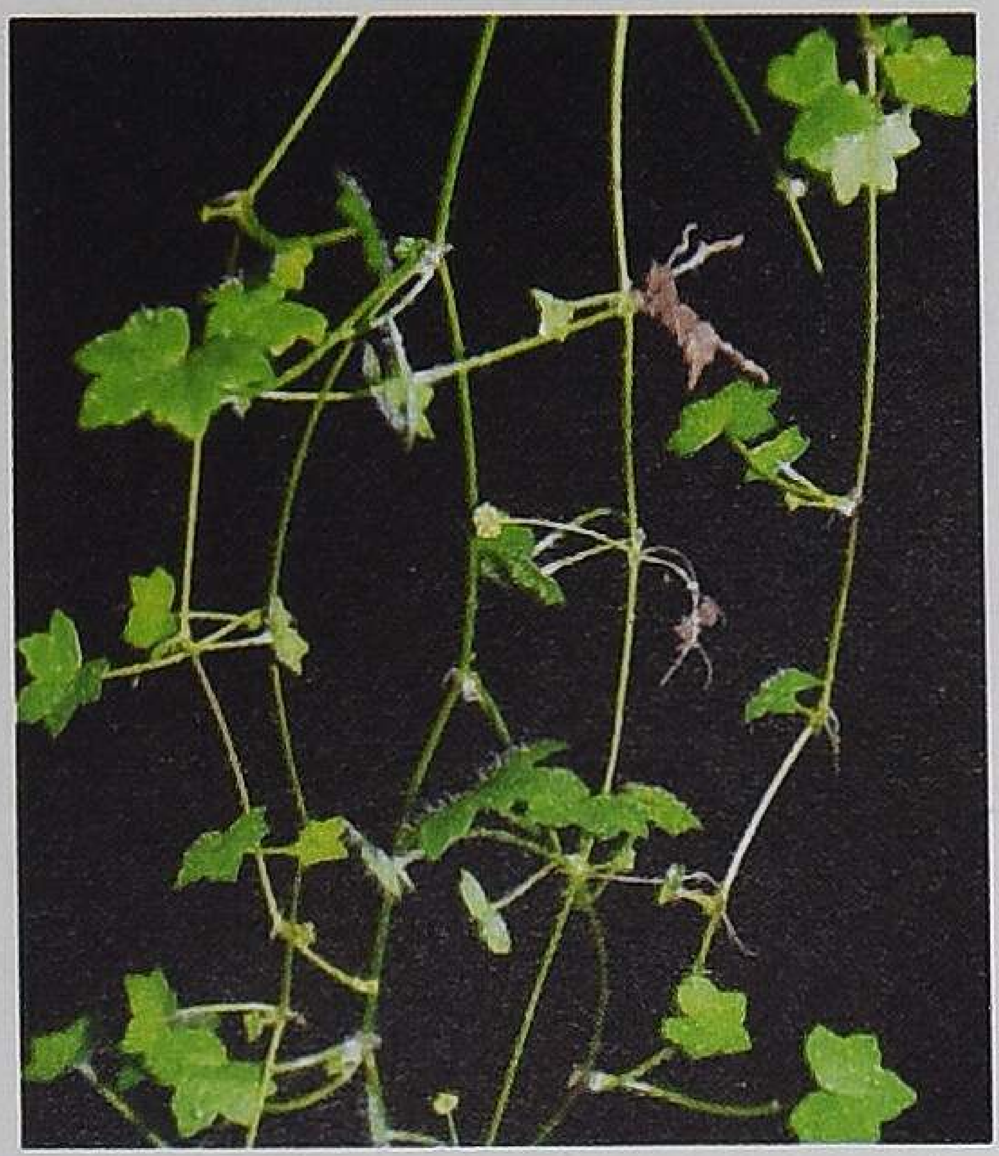


30. *Centella asiatica* (L.) Urban

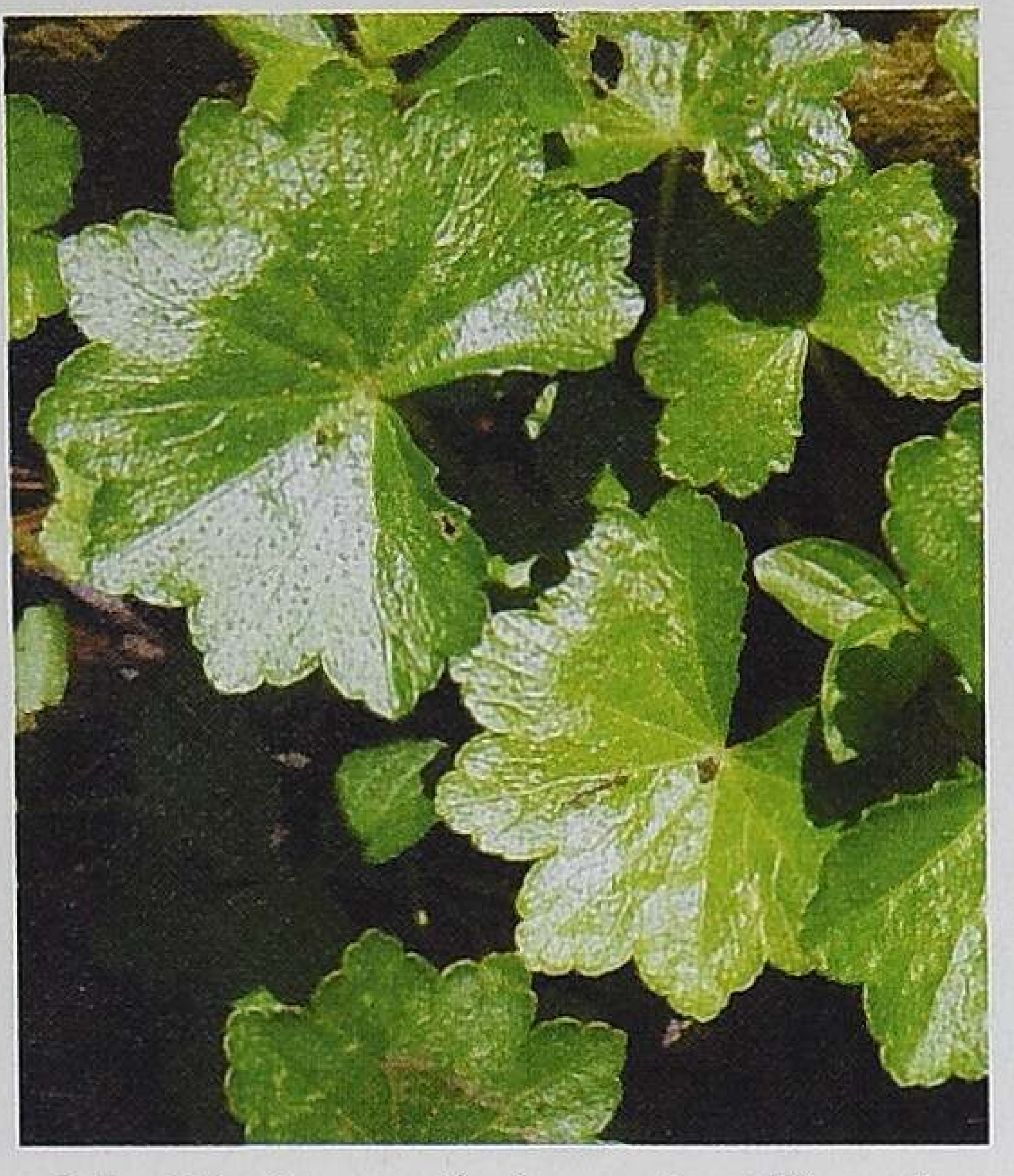
31. *Heracleum candolleanum* (Wight & Arn.) Gamble

32. *Heracleum rigens* Wall. ex DC.

33. *Heracleum sprengelianum* Wight & Arn.



34. *Hydrocotyle conferta* Wight



35. *Hydrocotyle javanica* Thunb.

36. *Hydrocotyle sibthorpioides* Lam.

PLATE 5

37. *Pimpinella candolleana* Wight & Arn.

38. *Pimpinella leschenaultii* DC.

39. *Vanasushava pedata* (Wight) P.K. Mukh. & Constance

40. *Rauvolfia verticillata* (Lour.) Baill.

41. *Ilex denticulata* Wall. ex Wight

42. *Ilex gardneriana* Wight

43. *Ilex walkeri* Wight & Gard. ex Thw.

44. *Ilex wightiana* Wall. ex Wight

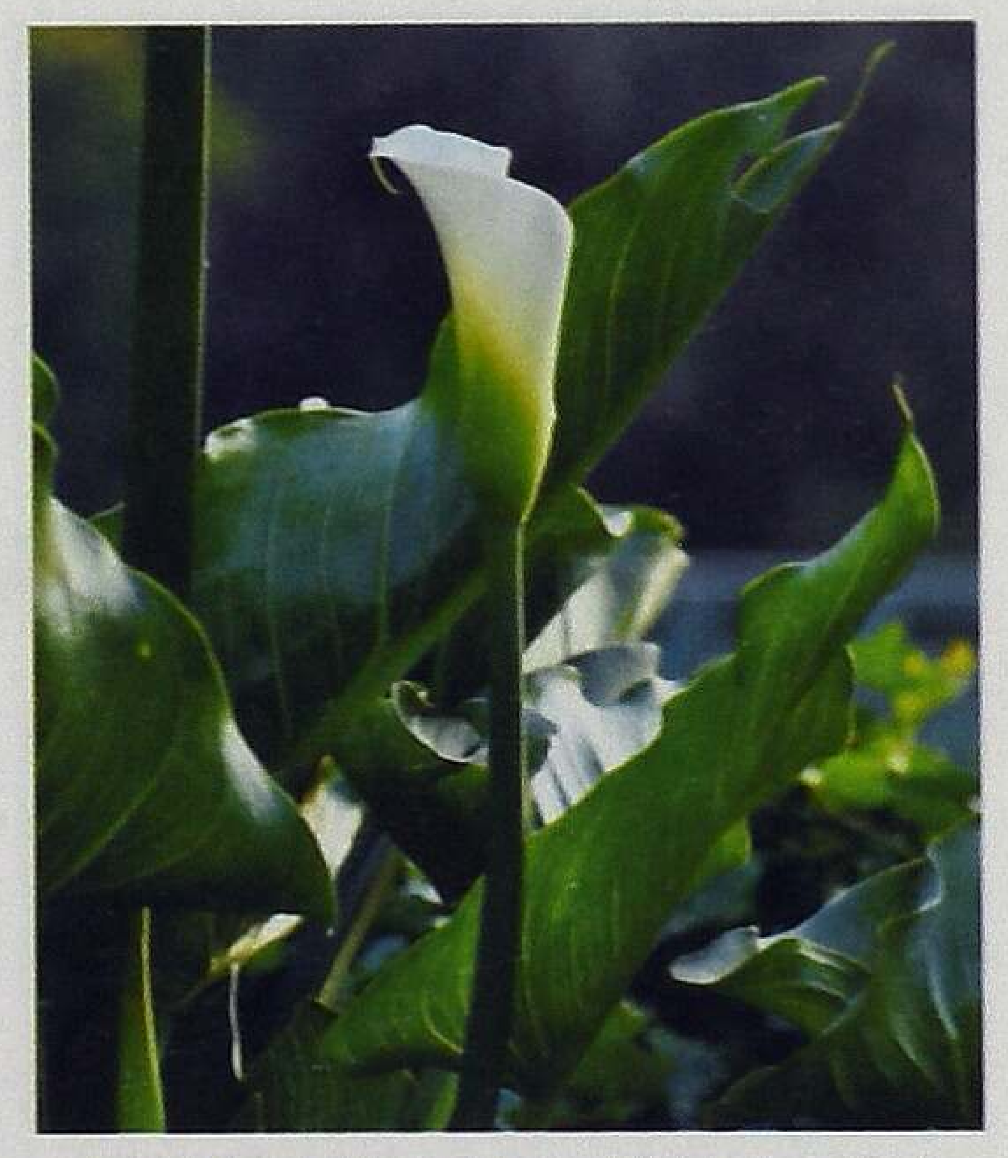
45. *Acorus calamus* L.

PLATE 6

46. *Arisaema leschenaultii* Blume

47. *Arisaema tortuosum* (Wall.) Schott

48. *Colocasia esculenta* (L.) Schott

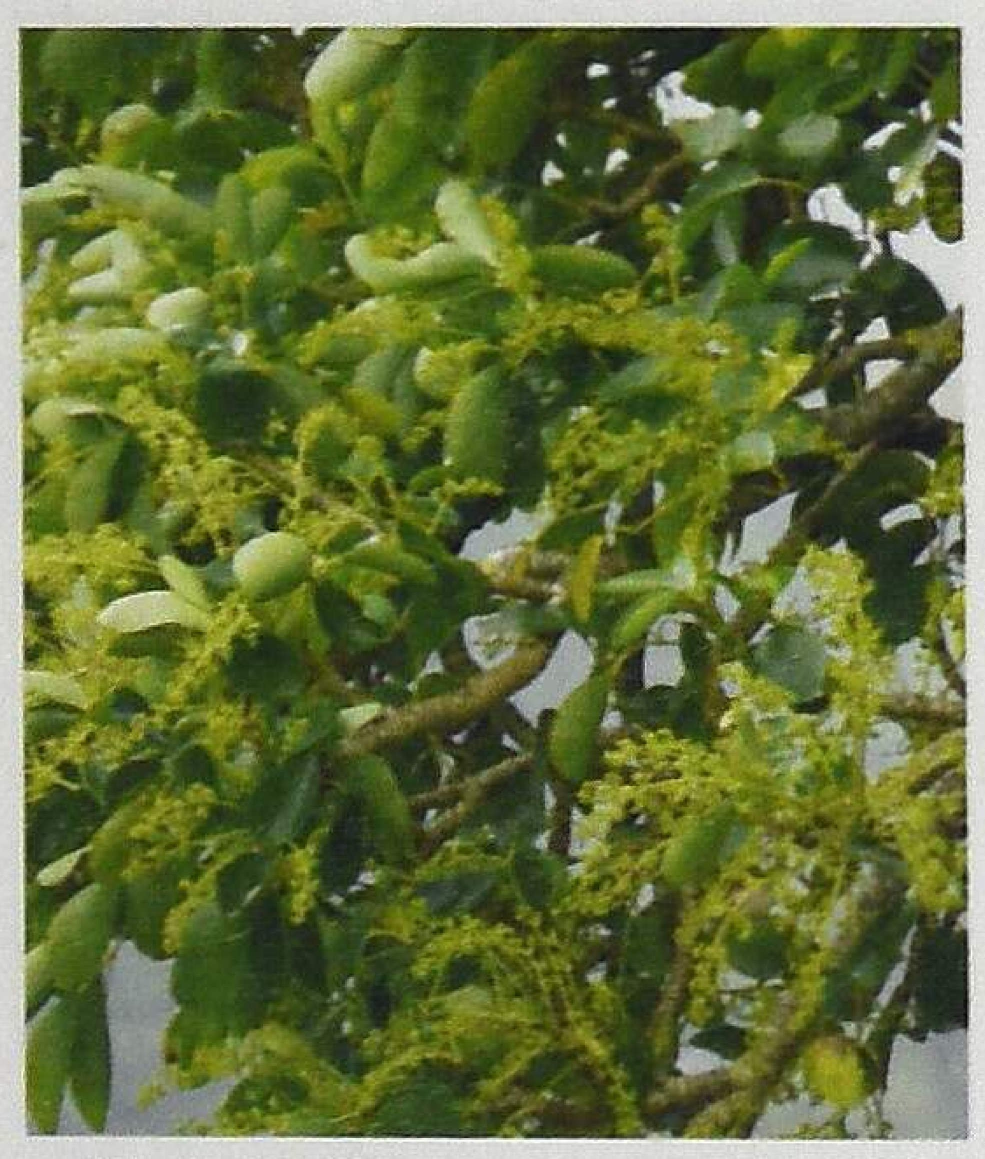


49. *Zantedeschia aethiopica* (L.) Spreng.

50. *Schefflera capitata* (Wight & Arn.) Harms

51. *Schefflera racemosa* (Wight) Harms

52. *Schefflera rostrata* (Wight) Harms



53. *Schefflera stellata* (Gaertn.) Harms

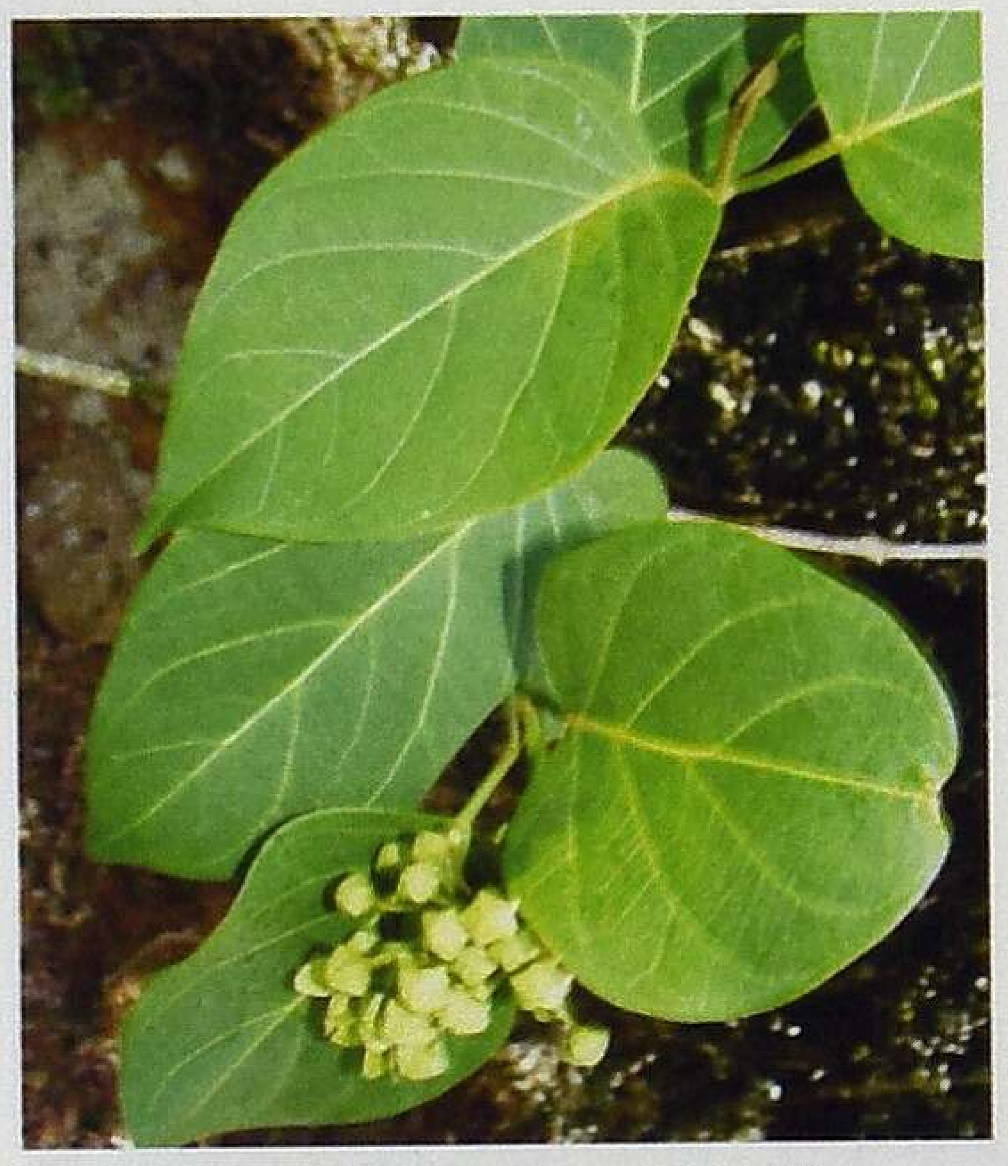
54. *Phoenix loureiroi* Kunth

PLATE 7

55. *Decalepis nervosa* (Wight & Arn.) Venter

56. *Gymnema hirsutum* Wight & Arn.

57. *Gymnema indicum* (M.A. Rahman & Wilcock) Karthik. & Moorthy



58. *Wattakaka volubilis* (L. f.) Stapf

59. *Acmella calva* (DC.) R.K. Jansen

60. *Adenostemma lavenia* (L.) O. Ktze.

61. *Ageratina adenophora* (Spreng.) King & Robins.

62. *Ageratum houstonianum* Mill.

63. *Anaphalis aristata* DC.

PLATE 8

64. *Anaphalis beddomei* Hook. f.

65. *Anaphalis bournei* Fyson

66. *Anaphalis marcescens* (Wight) Clarke

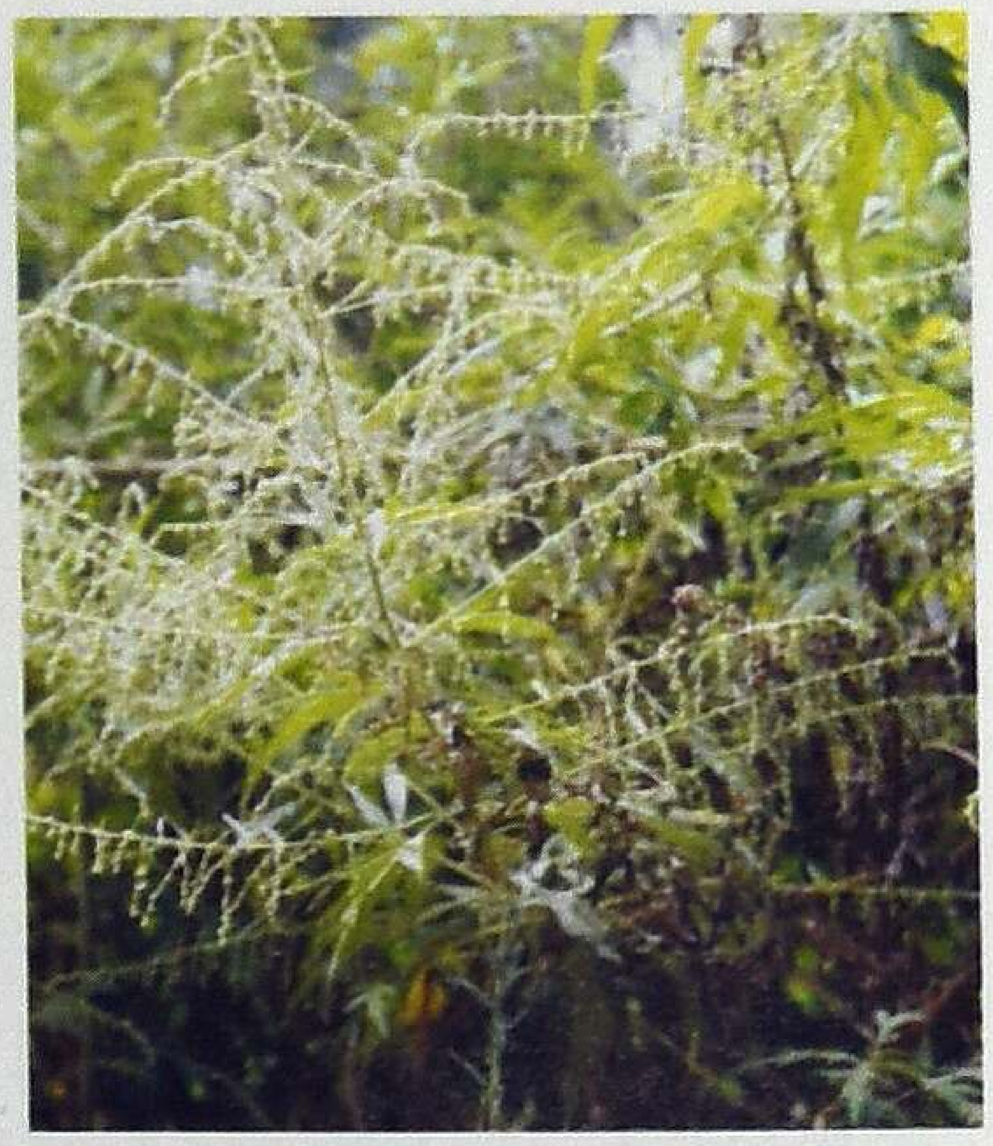
67. *Anaphalis meeboldii* W. W. Smith

68. *Anaphalis neelgerryana* (Sch.-Bip. ex DC.) DC.

69. *Anaphalis subdecurrens* (DC.) Gamble

70. *Anaphalis travancorica* W. W. Smith

71. *Anaphalis wightiana* (DC.) DC.



72. *Artemisia nilagarica* (Clarke) Pamp.

PLATE 9

73. *Bidens pilosa* L. var. *minor* (Blume) Sherff

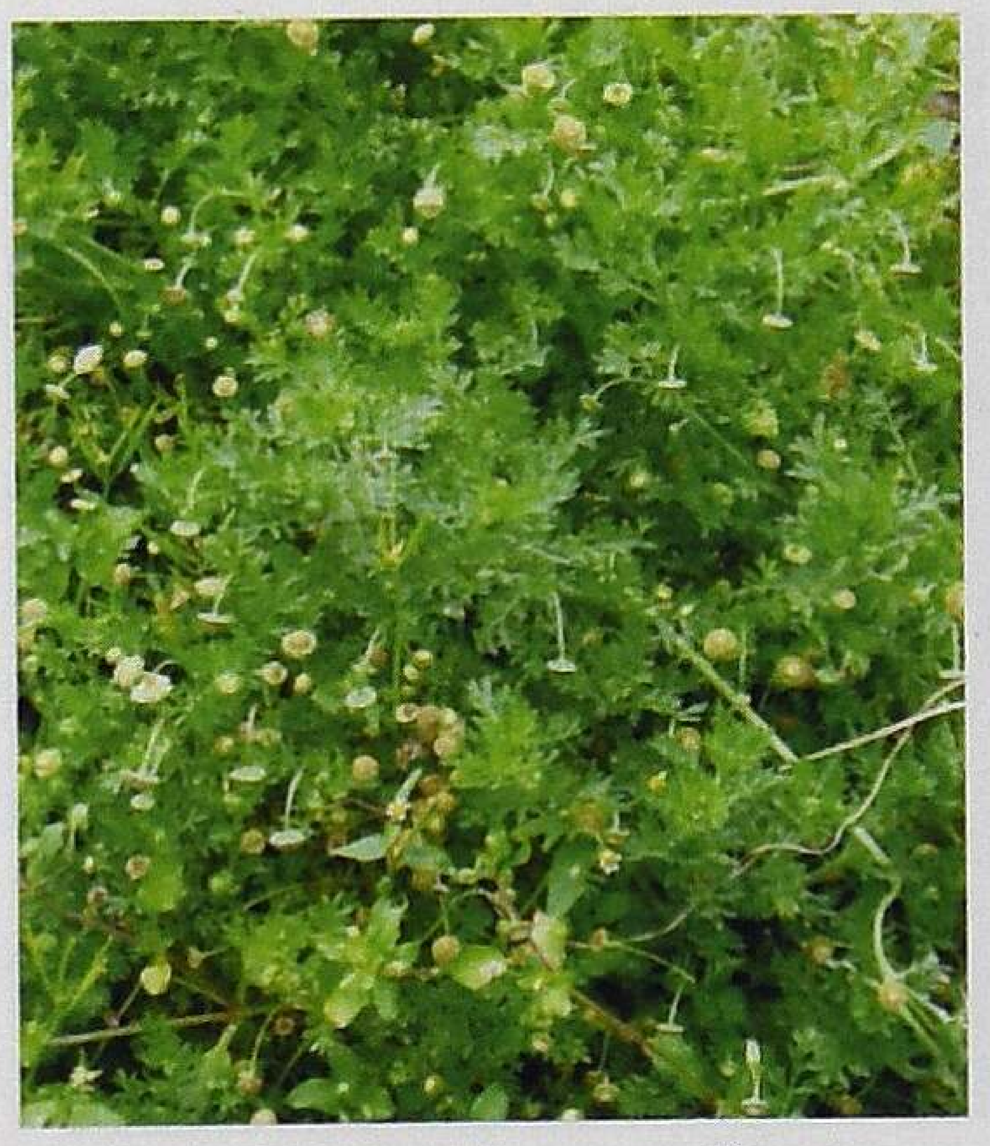
74. *Blumea axillaris* (Lam.) DC.

75. *Cirsium wallichii* DC. var. *wightii* (Hook. f.) Vivek.

76. *Cissampelopsis corymbosa* (Wall. ex DC.) Jeffrey & Chen.

77. *Conyza bonariensis* (L.) Cronq.

78. *Conyza stricta* Willd.



79. *Cotula australis* (Sieb. ex Spreng.) Hook. f.

80. *Crassocephalum crepidioides* (Benth.) S. Moore

81. *Dahlia imperialis* Roezl ex Ortgies

PLATE 10

82. *Dichrocephala chrysanthemifolia* (Blume) DC.

83. *Dichrocephala integrifolia* (L. f.) O. Ktze.

84. *Emilia ramulosa* Gamble

85. *Emilia sonchifolia* (L.) DC.

86. *Erigeron karvinskianus* DC.

87. *Galinsoga parviflora* Cav.

88. *Gamochaeta pensylvanica* (Willd.) Cabrera

89. *Gynura nitida* DC.

90. *Gynura travancorica* W. W. Smith

PLATE 11

91. *Helichrysum bracteatum* (Vent.) T. Anders.

92. *Helichrysum buddleioides* DC.

93. *Hypochoeris glabra* L.

94. *Kleinia walkeri* (Wight) Uniyal

95. *Launaea acaulis* (Roxb.) Babc. ex Kerr.

96. *Moonia heterophylla* Arn.

97. *Myriactis wightii* DC.

98. *Picris hieracioides* L.

99. *Senecio lavandulaefolius* DC.

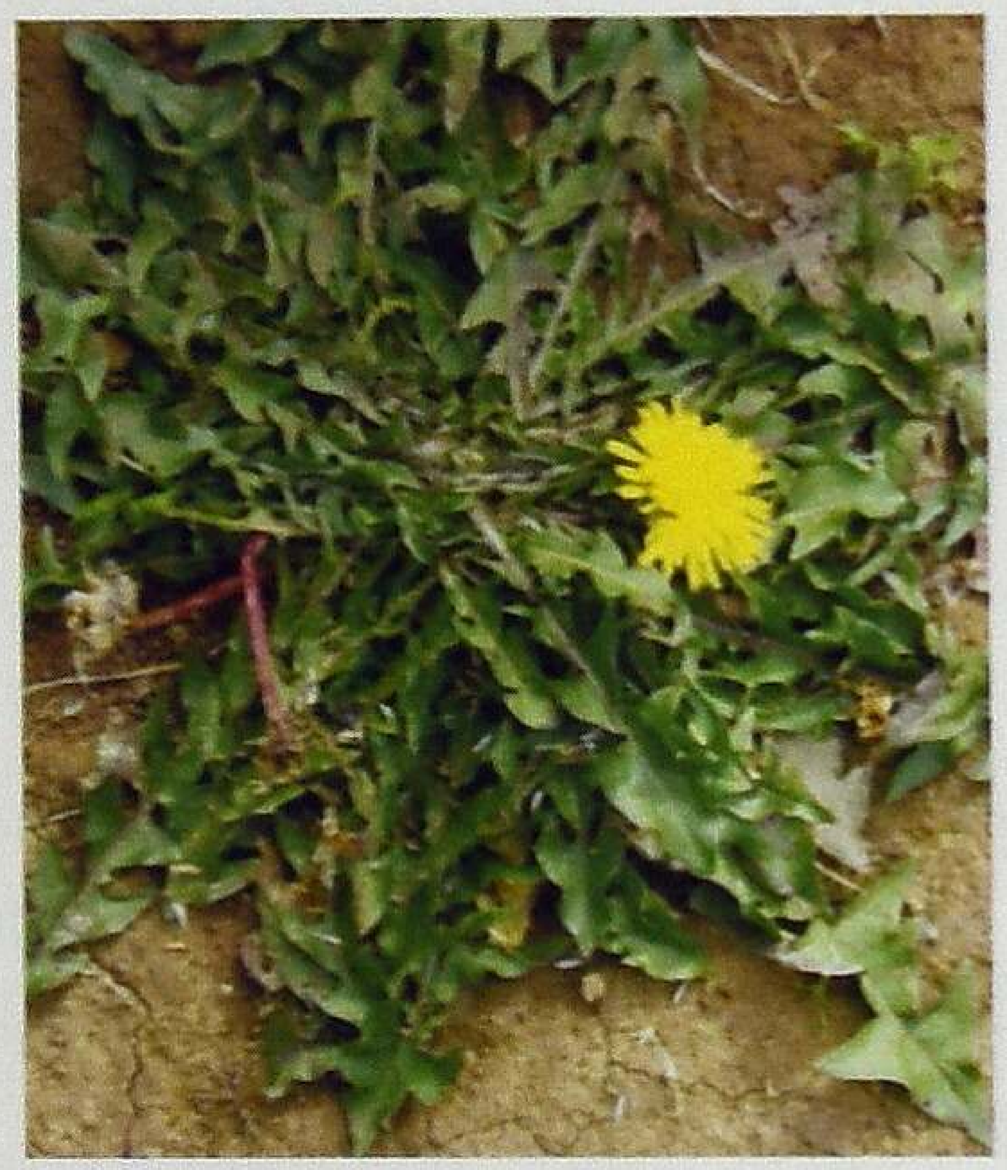
PLATE 12

100. *Senecio lessingianus* (Wight & Arn.) Clarke

101. *Senecio scandens* Hook. f.

102. *Senecio zeylanicus* DC.

103. *Sigesbeckia orientalis* L.



104. *Taraxacum javanicum* Soest

105. *Vernonia arborea* Buch.-Ham.

106. *Vernonia conyzoides* DC.

107. *Vernonia pectiniformis* DC.

108. *Youngia japonica* (L.) DC.

PLATE 13

109. *Impatiens campanulata* Wight

110. *Impatiens chinensis* L.

111. *Impatiens clavicornu* Turcz.

112. *Impatiens cordata* Wight

113. *Impatiens fruticosa* Lesch. ex DC.

114. *Impatiens gardneriana* Wight

115. *Impatiens goughii* Wight

116. *Impatiens hensloviana* Arn.

117. *Impatiens latifolia* L.

PLATE 14

118. *Impatiens leschenaultii* (DC.) Wall. ex Wight & Arn.

119. *Impatiens levingei* Gamble ex Hook. f.

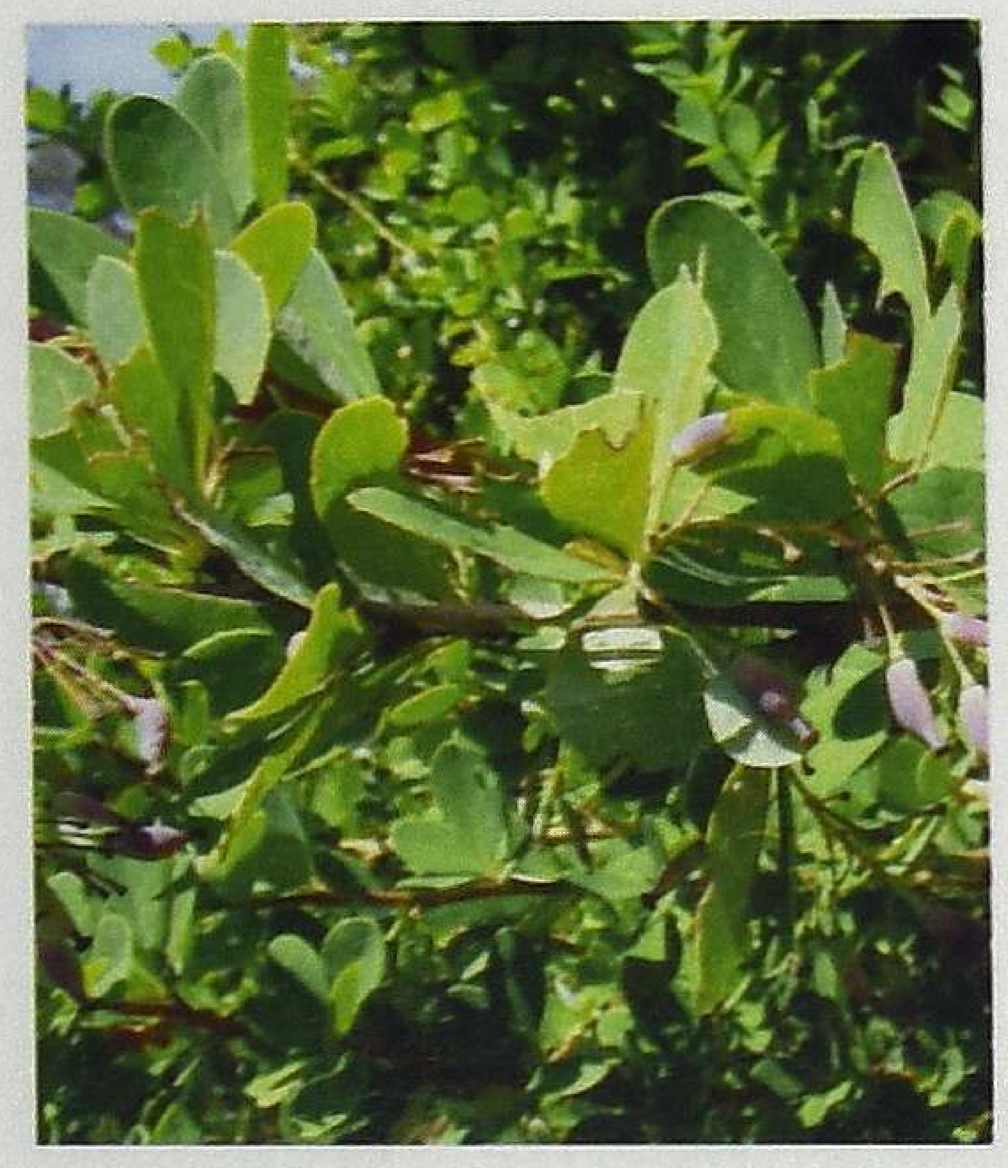
120. *Impatiens minor* (DC.) Bennet

121. *Impatiens modesta* Wight

122. *Impatiens parasitica* Bedd.

123. *Impatiens phoenicea* Bedd.

124. *Impatiens tomentosa* Heyne ex Wight & Arn.



125. *Berberis tinctoria* Lesch.

125 a. *Berberis tinctoria* Lesch.

PLATE 15

126. *Mahonia leschenaultii* (Wall. ex Wight & Arn.) Takeda ex Gamble

127. *Alnus nepalensis* D.Don

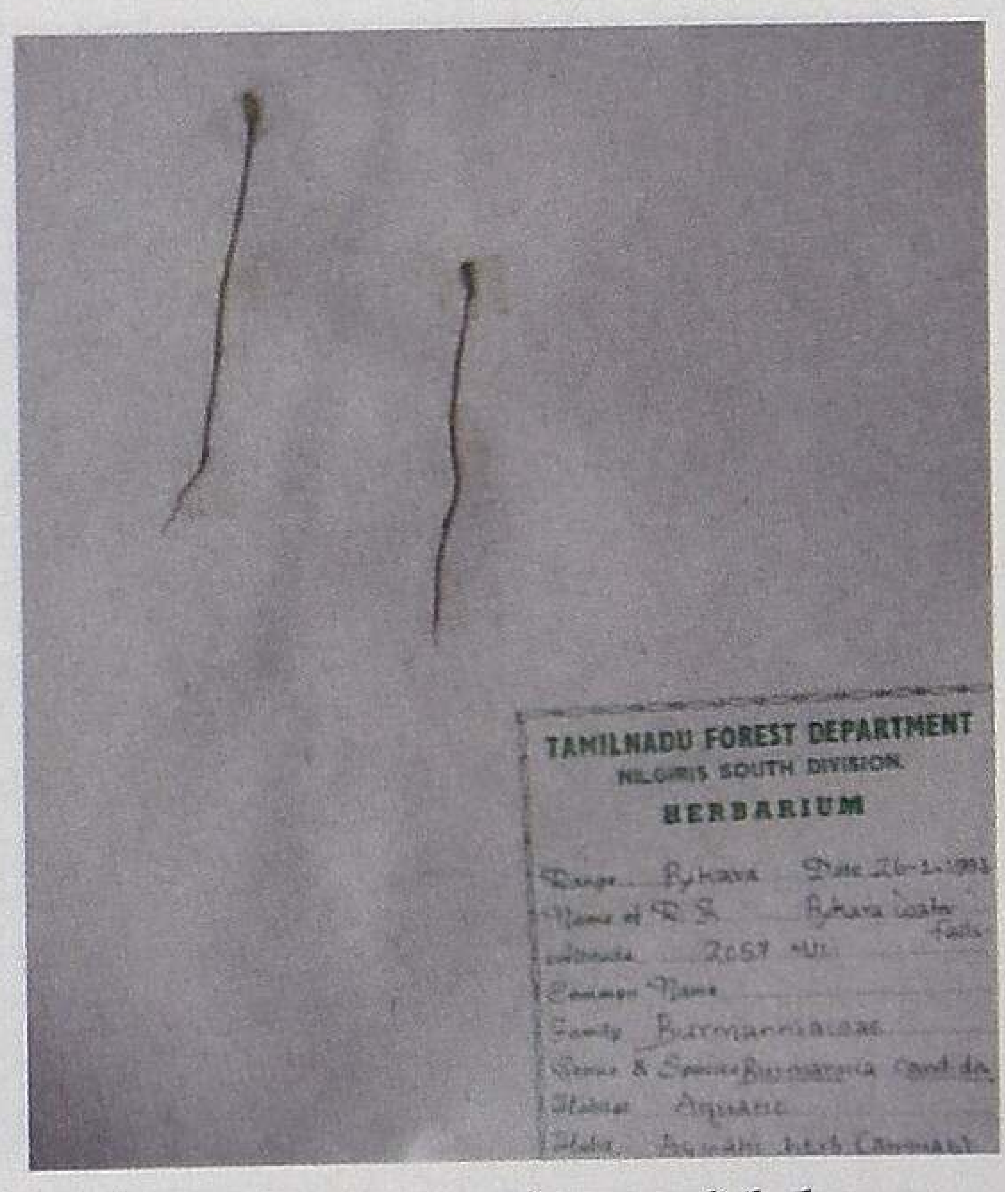
128. *Cynoglossum zeylanicum* (Vahl ex Hornem.) Thunb. ex Lehm.

129. *Capsella bursa-pastoris* (L.) Medik.

130. *Cardamine africana* L.

131. *Cardamine hirsuta* L.

132. *Coronopus didymus* (L.) Smith



133. *Burmannia candelabrum* Gagnep.

134. *Buxus papillosa* C. Schneider

PLATE 16

135. *Sarcococca saligna* (D. Don) Muell.-Arg.

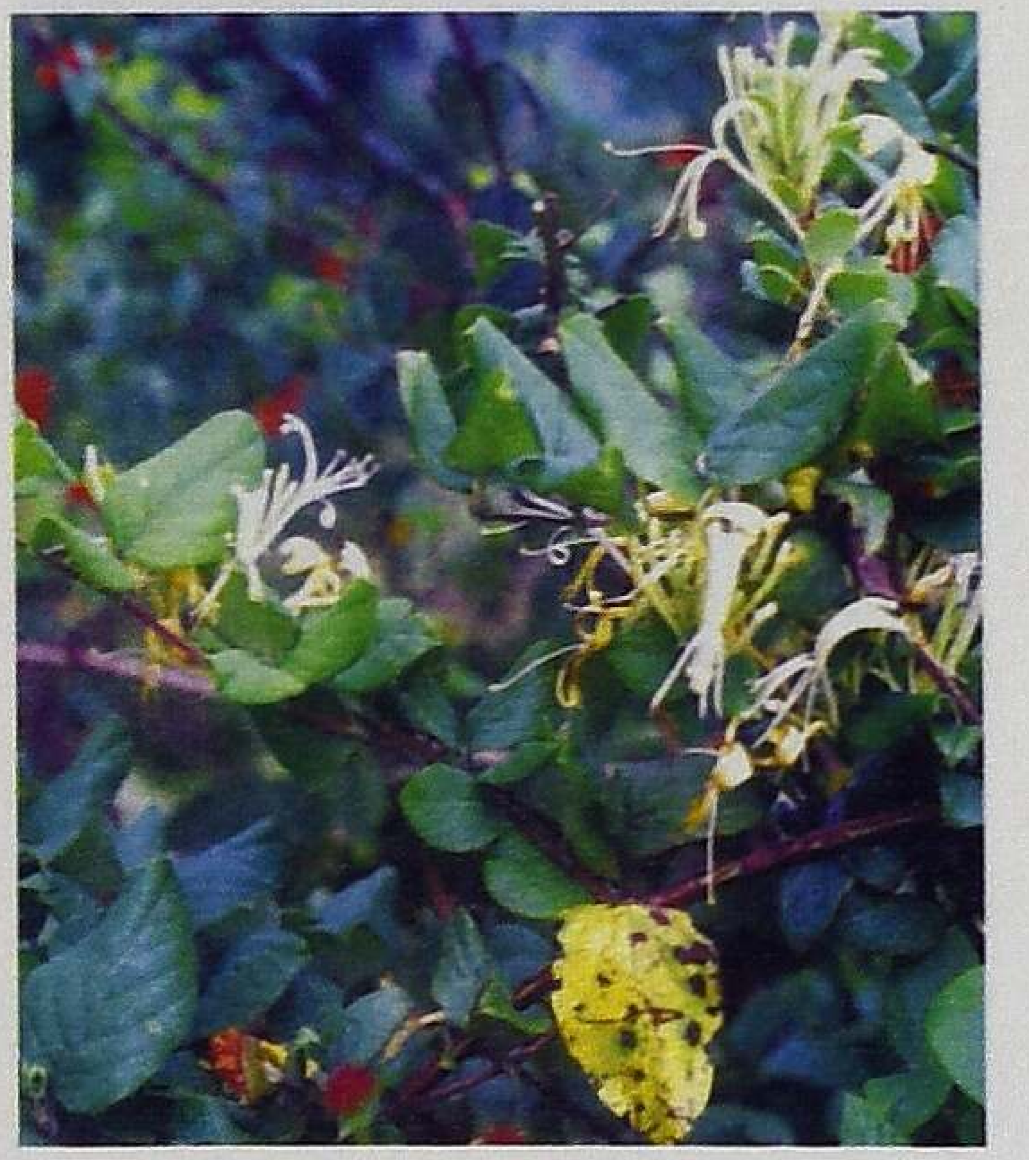
136. *Caesalpinia decapetala* (Roth) Alston

137. *Chamaecrista nictitans* (L.) Moench ssp. *patellaria*

138. *Senna didymobotrya* (Fresen.) Irwin & Barneby

139. *Senna septemtrionalis* (Viv.) Irwin & Barneby var. *pubescens*

140. *Wahlenbergia marginata* (Thunb.) A. DC.



141. *Lonicera leschenaultii* Wall.

142. *Lonicera ligustrina* Wall.

143. *Viburnum coriaceum* Blume

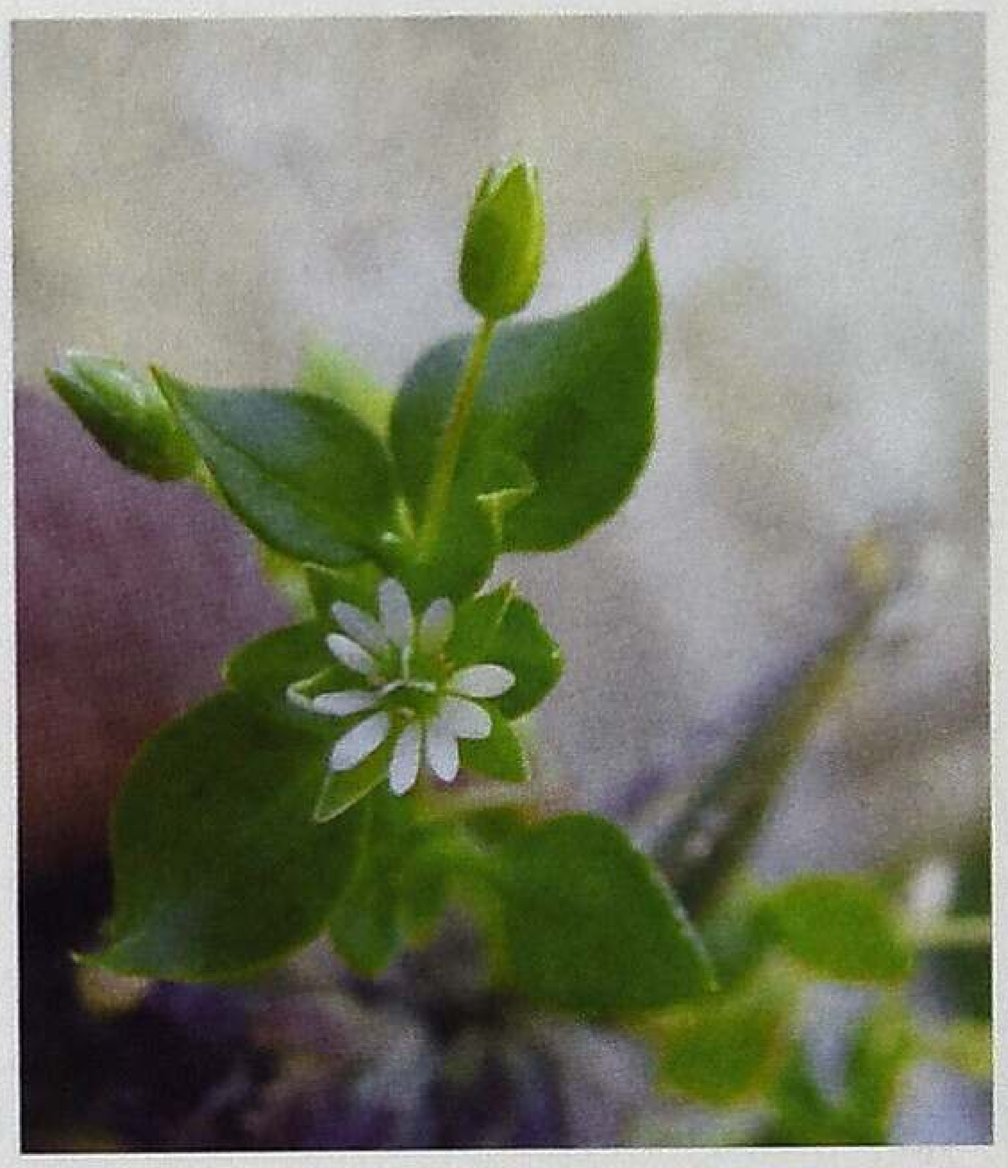
PLATE 17

144. *Viburnum erubescens* Wall. ex DC.

144 a. *Viburnum erubescens* Wall. ex DC.

145. *Viburnum punctatum* Buch.-Ham. ex D. Don

146. *Cerastium glomeratum* Thuill.



147. *Cerastium indicum* Wight & Arn.

148. *Drymaria cordata* (L.) Willd. ex Roem. & Schult. ssp. *diandra* (Blume) Duke

149. *Polycarpon tetraphyllum* (L.) L.

150. *Spergula arvensis* L.

151. *Stellaria media* (L.) Vill.

PLATE 18

152. *Cassine paniculata* (Wight & Arn.) Lobr.-Callen

153. *Celastrus paniculatus* Willd.

154. *Euonymus angulatus* Wight

155. *Euonymus crenulatus* Wall. ex Wight & Arn.

156. *Euonymus dichotomus* Heyne ex Roxb.

157. *Maytenus ovata* (Wall. ex Wight & Arn.) Loes.

158. *Microtropis microcarpa* Wight var. *densiflora* (Wight) Meissner & Freem.

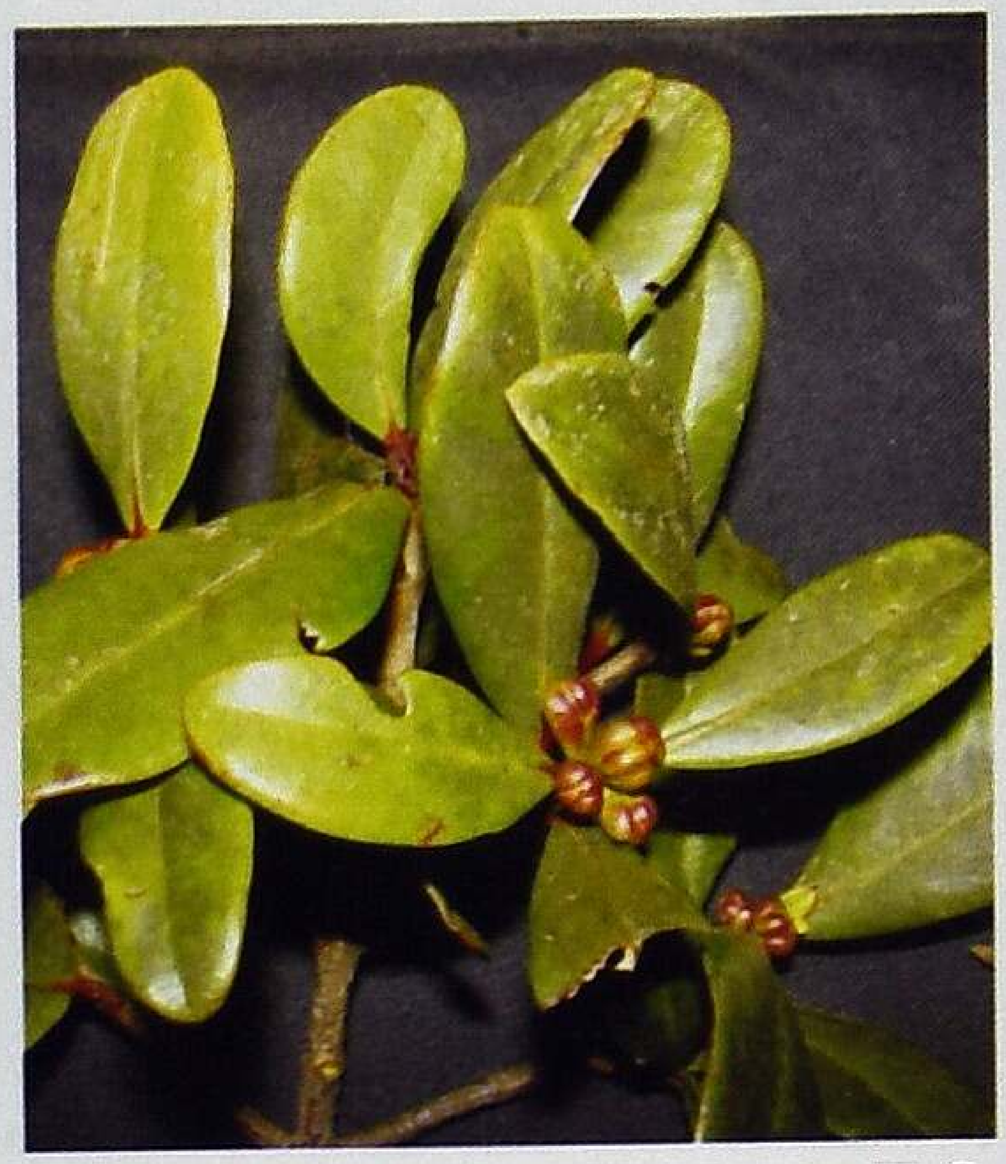
159. *Microtropis microcarpa* Wight var. *microcarpa*

160. *Microtropis ramiflora* Wight

PLATE 19

161. *Chenopodium album* L.

162. *Dysphania ambrosioides* (L.) Mosyakin & Clemants



163. *Garcinia cowa* Roxb. ex DC.

164. *Garcinia gummi-gutta* (L.) Robs.

165. *Commelina wightii* Raiz.

166. *Cyanotis arachnoidea* Clarke

167. *Cyanotis obtusa* (Trim.) Trim.

168. *Cyanotis villosa* (Spreng.) Schult. f.

169. *Dictyospermum montanum* Wight

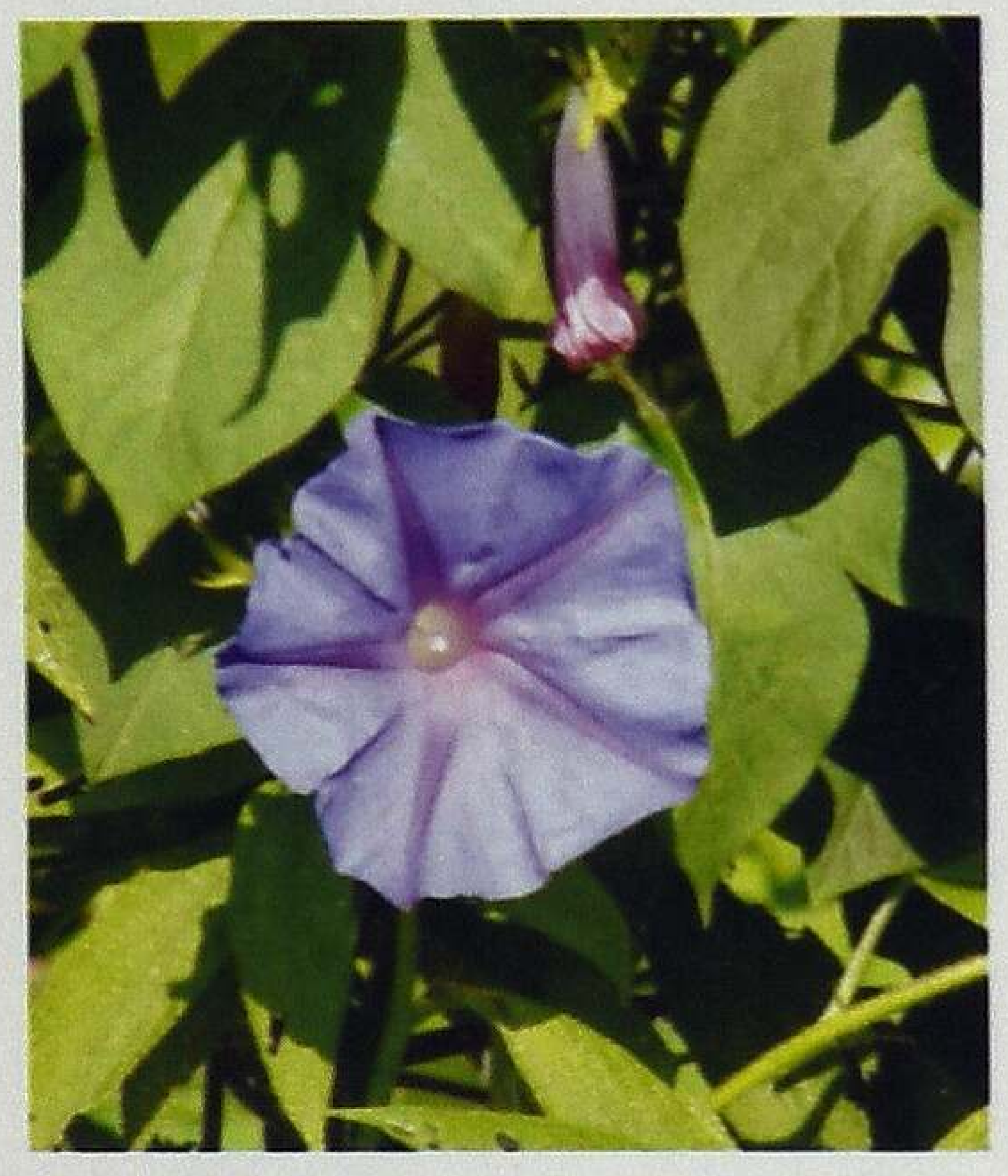
PLATE 20

170. *Dictyospermum ovalifolium* Wight

171. *Murdannia lanuginosa* (Wall. ex Clarke) Brueck.

172. *Argyreia elliptica* (Roth) Choisy

173. *Argyreia hirsuta* Wight & Arn.

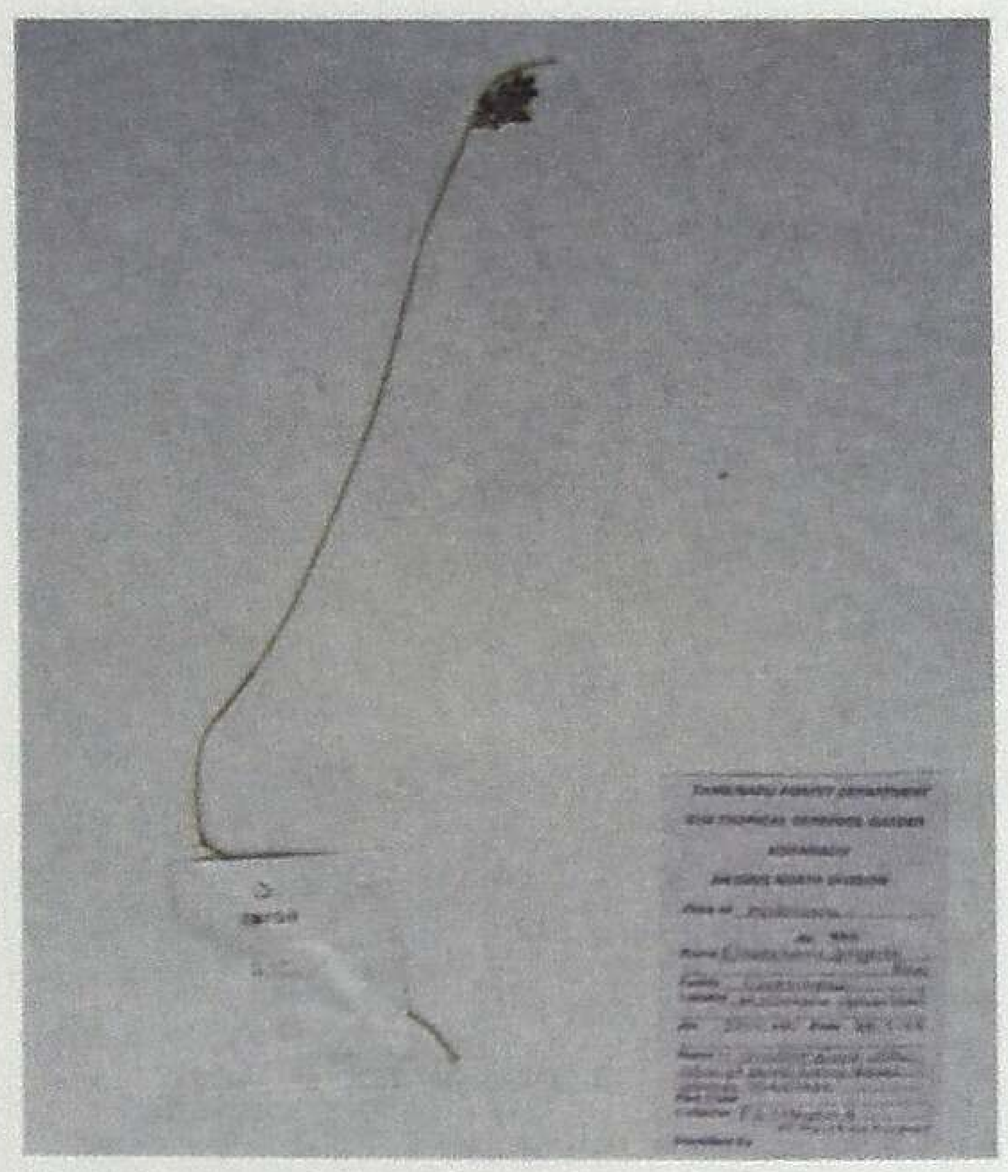


174. *Ipomoea purpurea* (L.) Roth

175. *Kalanchoe grandiflora* Wall. ex Wight & Arn.

176. *Zehneria maysorensis* (Wight & Arn.) Arn.

177. *Carex phacota* Spreng.



178. *Eleocharis congesta* D. Don

PLATE 21

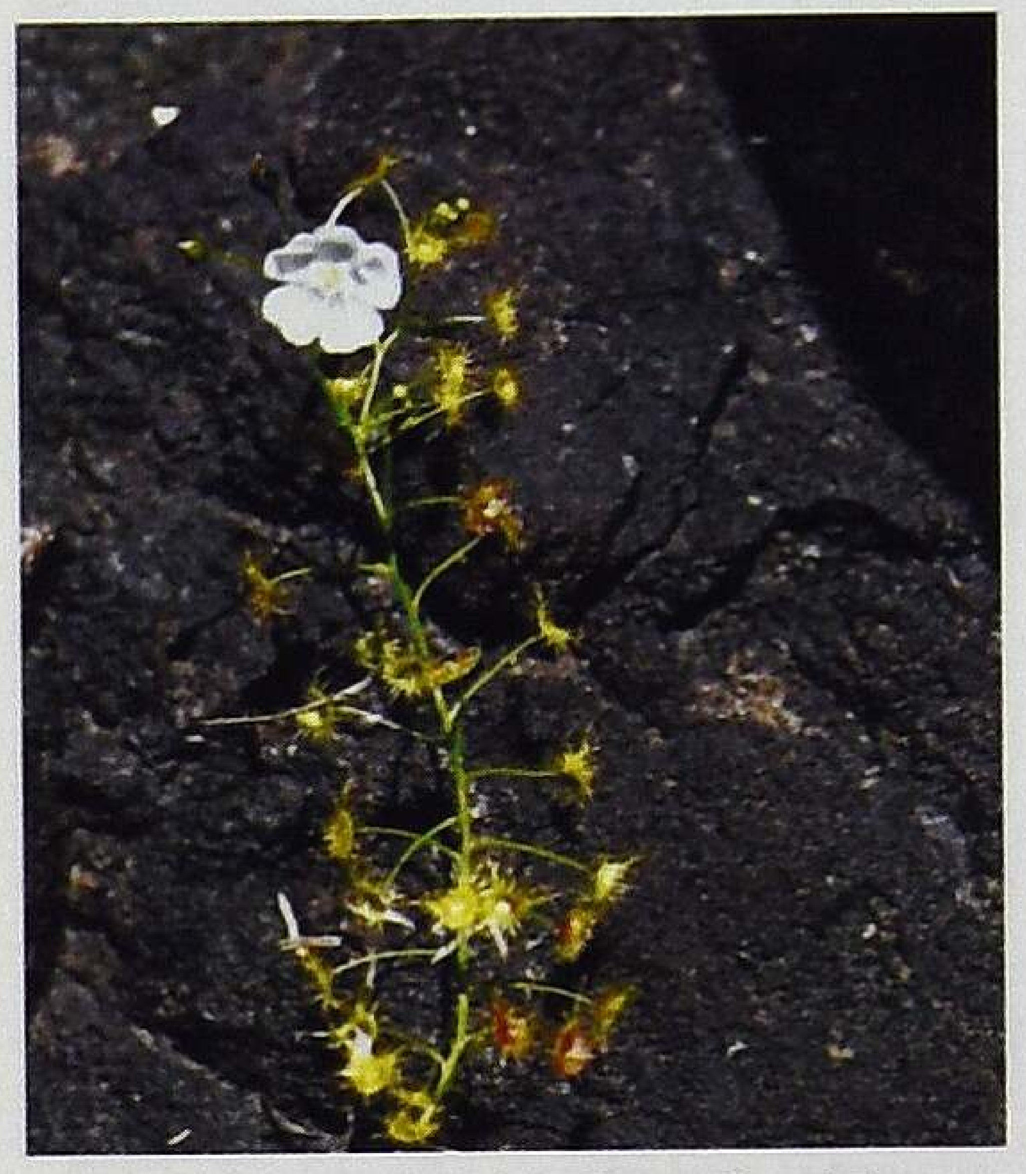
179. *Kyllinga melanosperma* Nees

180. *Schoenoplectiella articulata* (L.) Lye

181. *Schoenoplectus mucronatus* (L.) Palla

182. *Daphniphyllum neilgherrense* (Wight) K. Rosenth.

183. *Drosera burmannii* Vahl



184. *Drosera peltata* Smith

185. *Elaeagnus kologa* Schult.

186. *Elaeocarpus munronii* (Wight) Mast.

187. *Elaeocarpus recurvatus* Corner

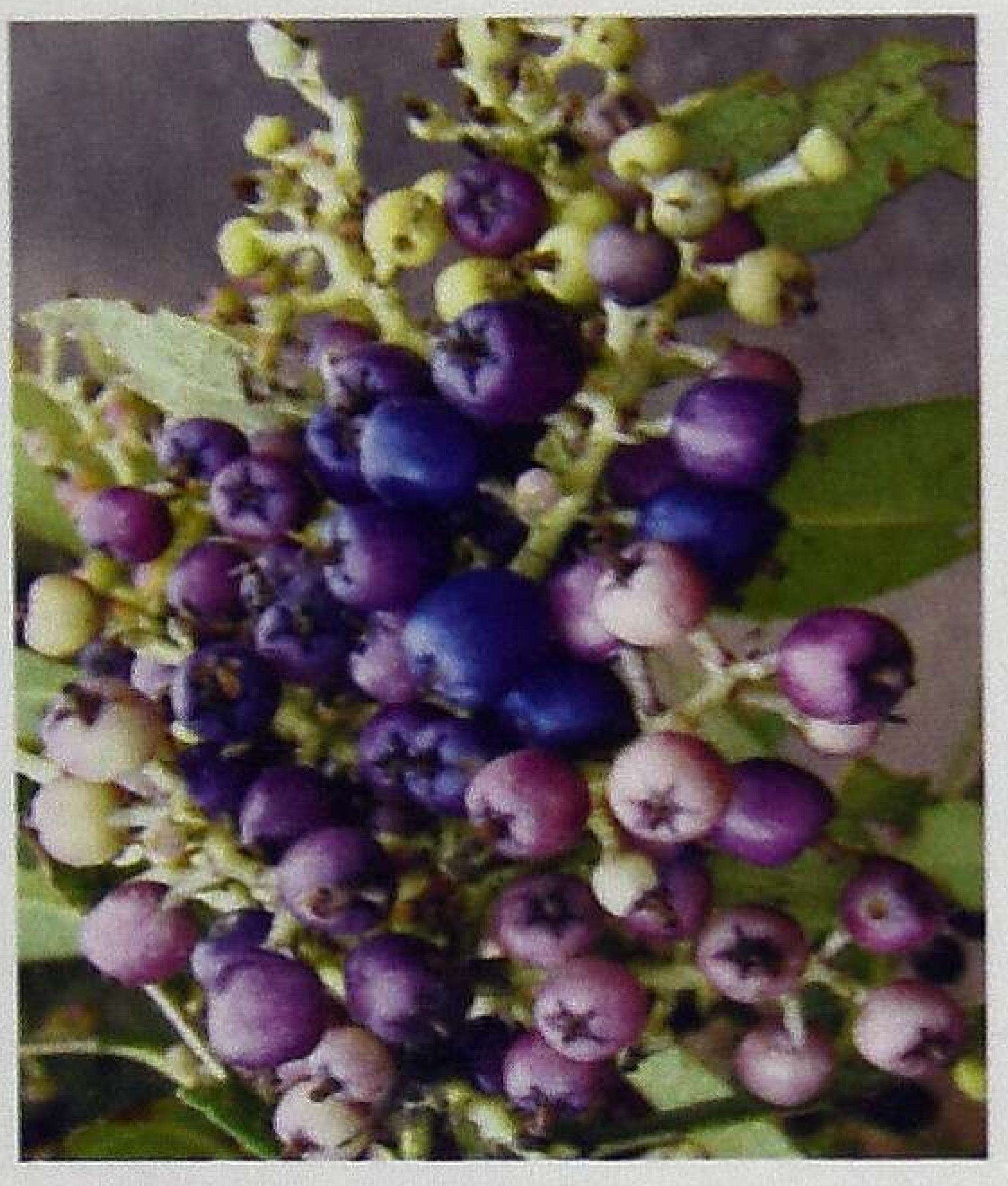
PLATE 22

188. *Elaeocarpus serratus* L.

189. *Elaeocarpus variabilis* Zmarzty

189a. *Elaeocarpus variabilis* Zmarzty

189b. *Elaeocarpus variabilis* Zmarzty

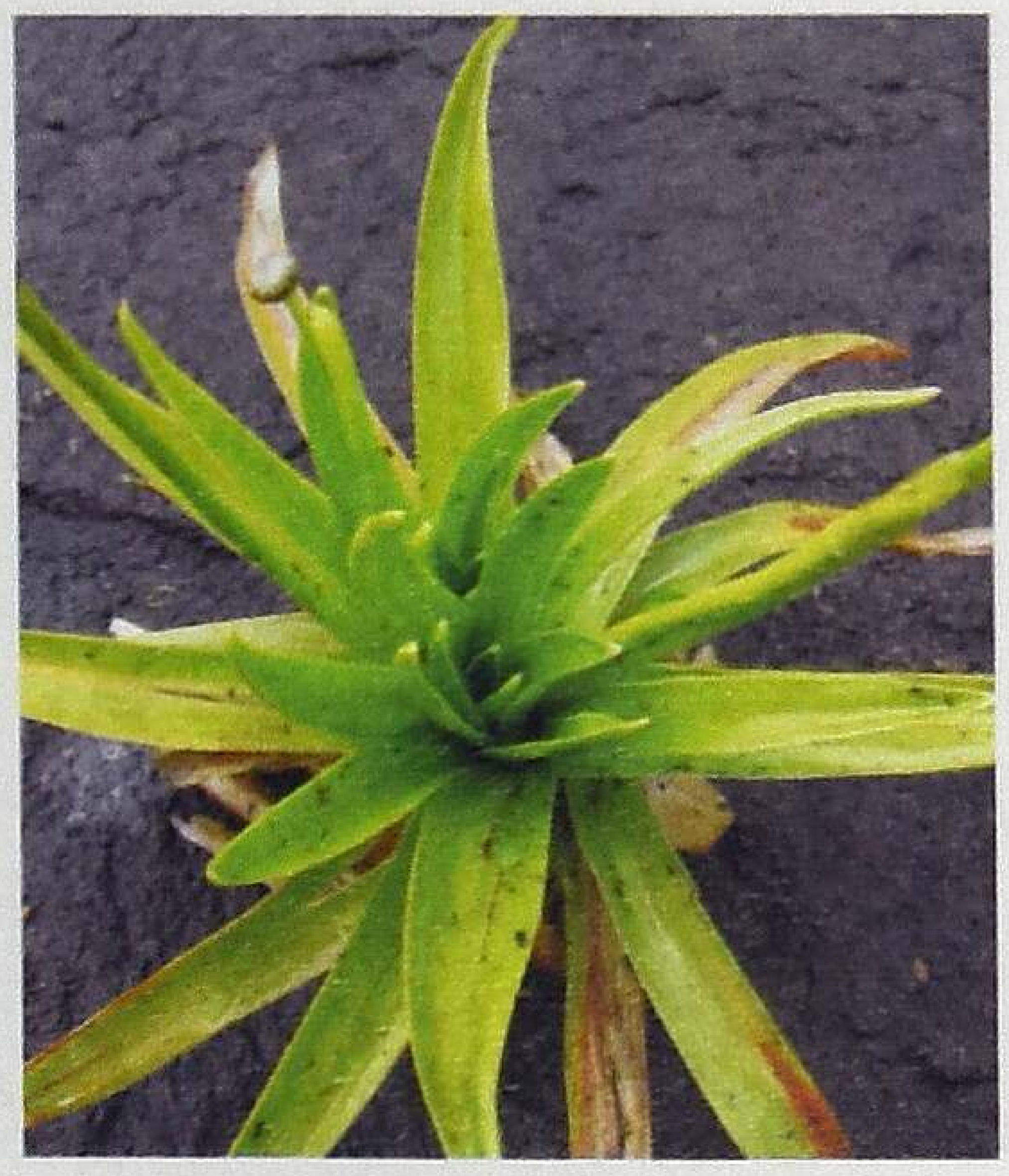


190. *Gaultheria fragrantissima* Wall.

191. *Rhododendron arboreum* J. E. Smith ssp. *nilagiricum* (Zenk.) Tagg.

192. *Eriocaulon brownianum* Mart. ex Wall.

193. *Eriocaulon odoratum* Dalz.



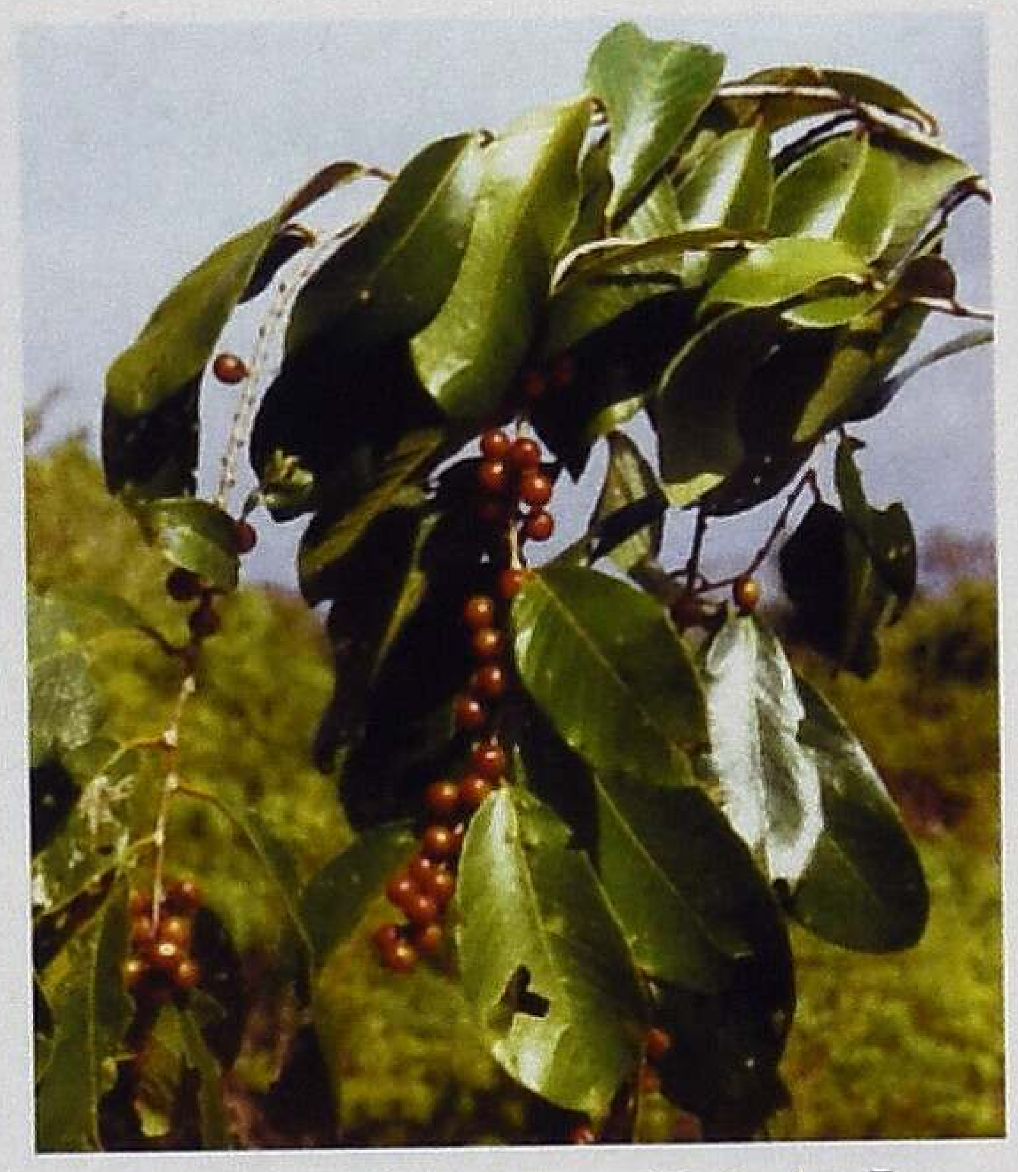
194. *Eriocaulon robustum* Steud.

PLATE 23

195. *Acalypha brachystachya* Hornem.

196. *Antidesma montanum* Blume

197. *Breynia retusa* (Dennst.) Alston



198. *Briedelia retusa* (L.) A. Juss.

199. *Croton laccifer* L.

200. *Euphorbia rothiana* Spreng.

201. *Glochidion candolleanum* (Wight & Arn.) Chakrab. & Gangop.

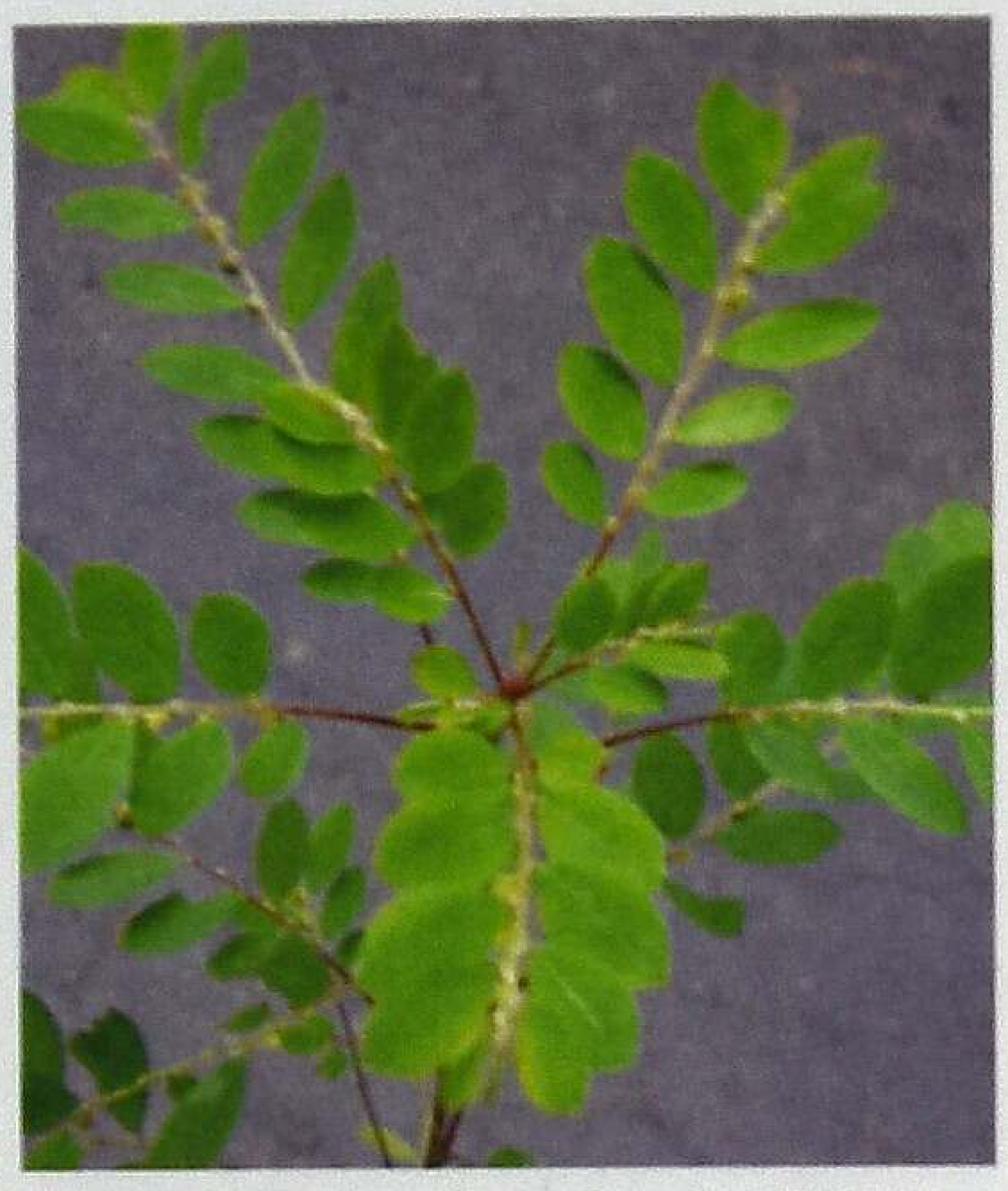
202. *Glochidion ellipticum* Wight

203. *Glochidion heyneanum* (Wight & Arn.) Wight

PLATE 24

204. *Macaranga indica* Wight

205. *Mallotus philippensis* (Lam.) Muell.-Arg.


206. *Phyllanthus rheedei* Wight

207. *Alysicarpus racemosus* Benth.

208. *Cajanus rugosus* (Wight & Arn.) van der Maesen

209. *Cajanus trinervius* (DC.) van der Maesen

210. *Crotalaria albida* Heyne ex Roth

211. *Crotalaria calycina* Schrank

212. *Crotalaria formosa* Graham ex Wight & Arn.

PLATE 25

213. *Crotalaria fysonii* Dunn

214. *Crotalaria notonii* Wight & Arn.

215. *Crotalaria obtecta* Graham ex Wight & Arn.

216. *Crotalaria scabrella* Wight & Arn.

217. *Crotalaria semperflorens* Vent.

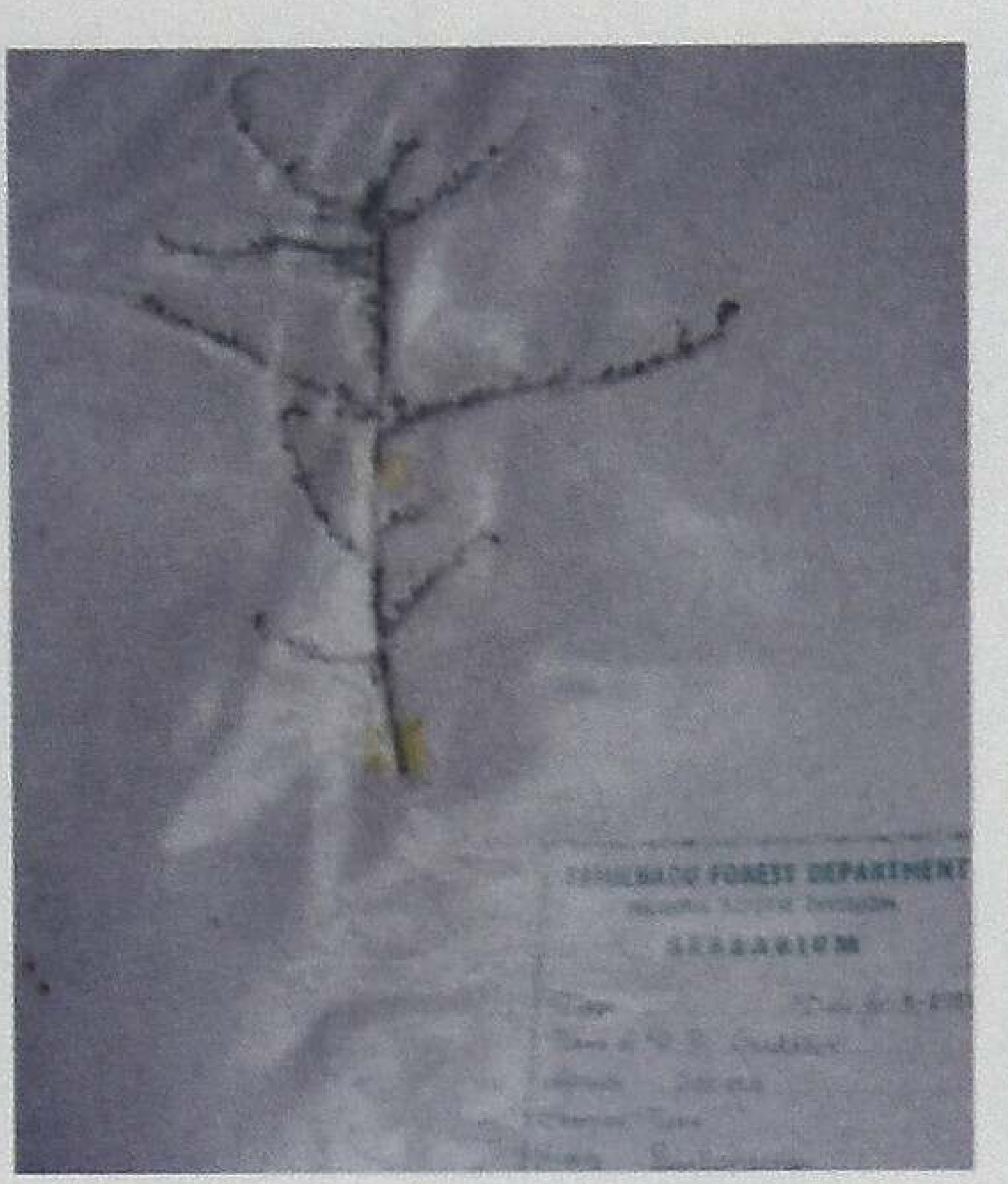
218. *Crotalaria walkeri* Arn.

219. *Cytisus scoparius* (L.) Link

220. *Desmodium alysicarpoides* van Meeuwen

221. *Desmodium ferrugineum* Wall. ex. Thw.

PLATE 26



222. *Desmodium microphyllum* (Thunb.) DC.

223. *Desmodium repandum* (Vahl) DC.

224. *Dumasia villosa* DC.

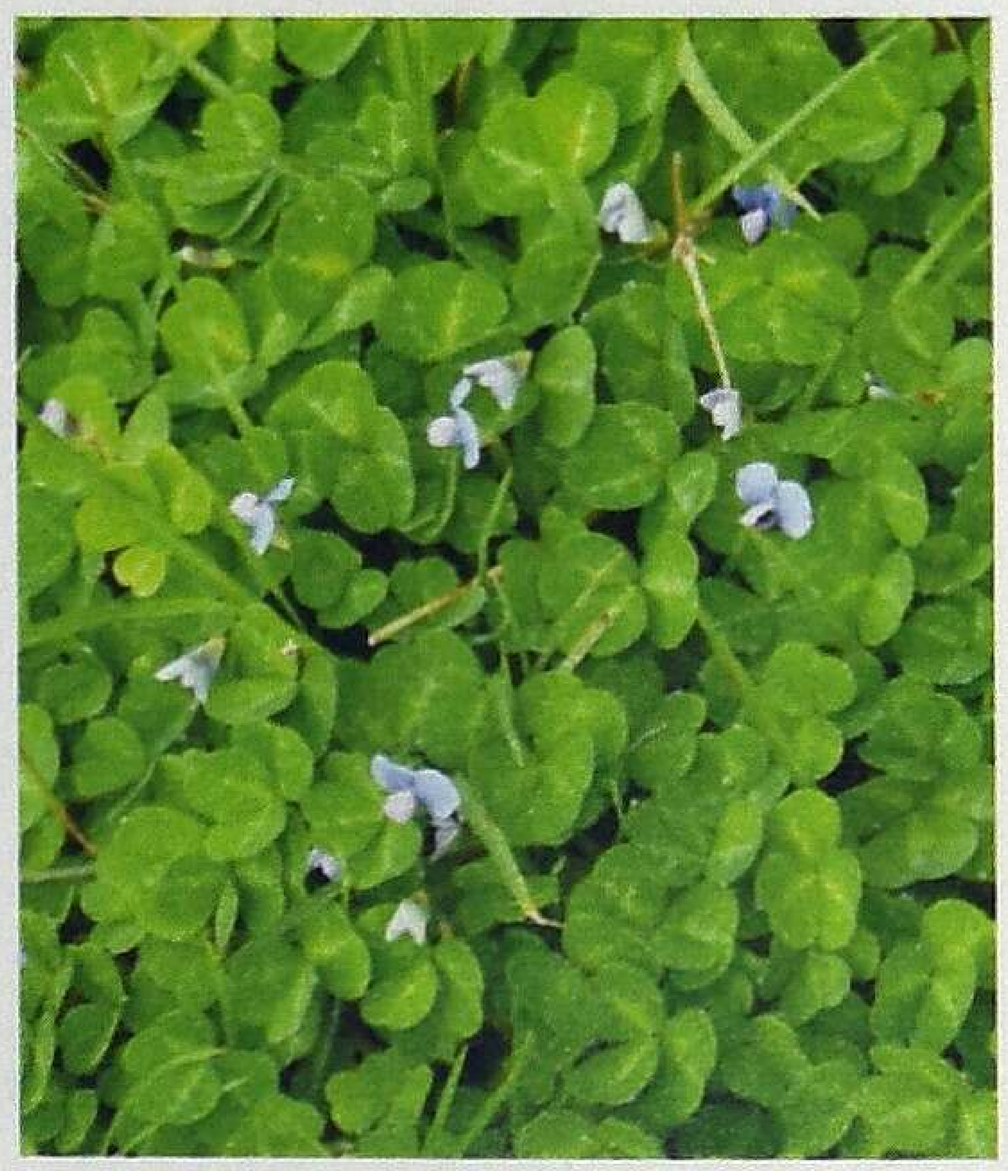
225. *Flemingia grahamiana* Wight & Arn.

226. *Flemingia macrophylla* (Willd.) Prain ex Merr.

227. *Flemingia nilgheriensis* (Baker) Wight ex Cooke

228. *Indigofera cassioides* Rottl. ex. DC.

229. *Indigofera pedicellata* Wight & Arn.



230. *Parochetus communis* Buch.-Ham. ex D. Don

PLATE 27

231. *Shuteria involucrata* (Wall.) Wight & Arn.

232. *Smithia blanda* Wall. ex Wight & Arn.

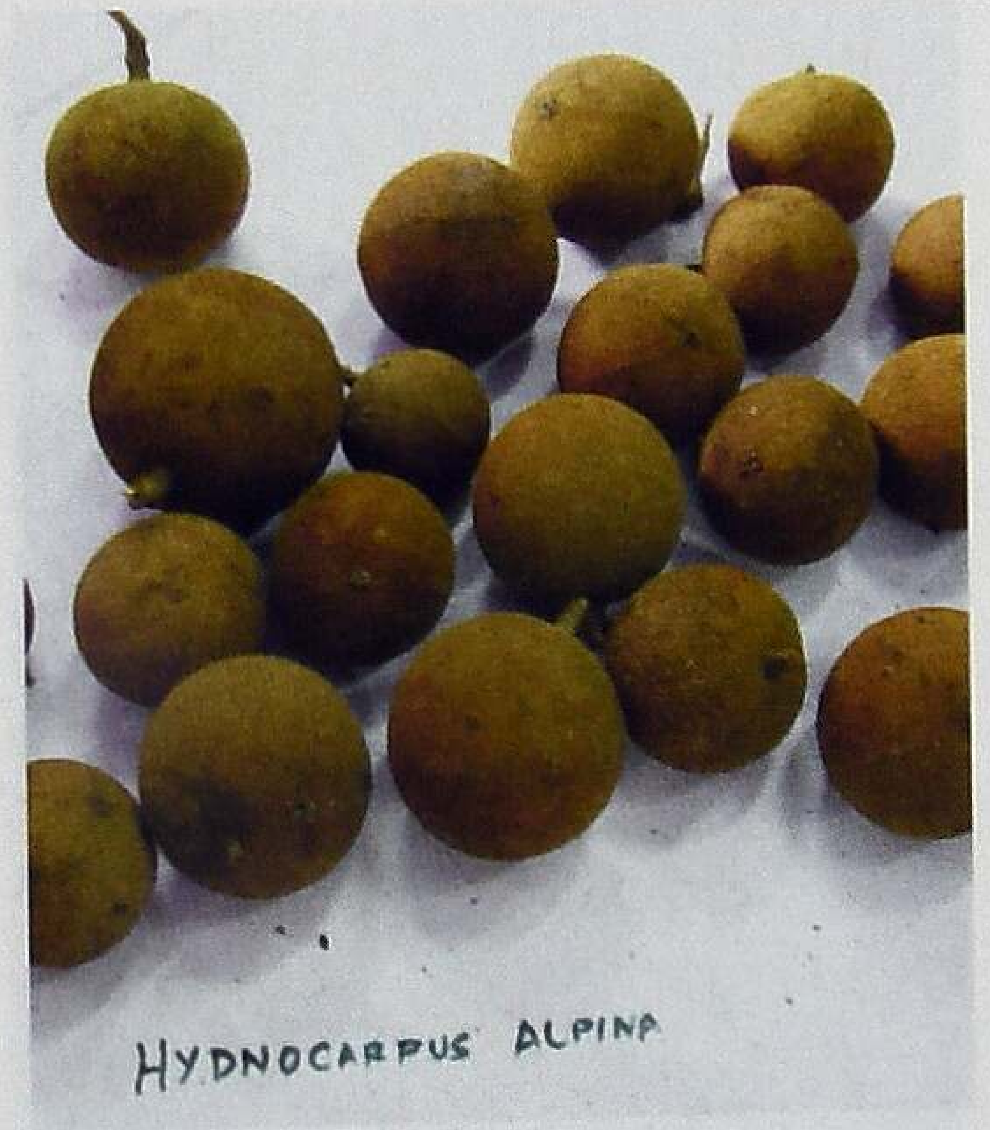
233. *Sophora velutina* Lindl.

234. *Trifolium dubium* Sibth

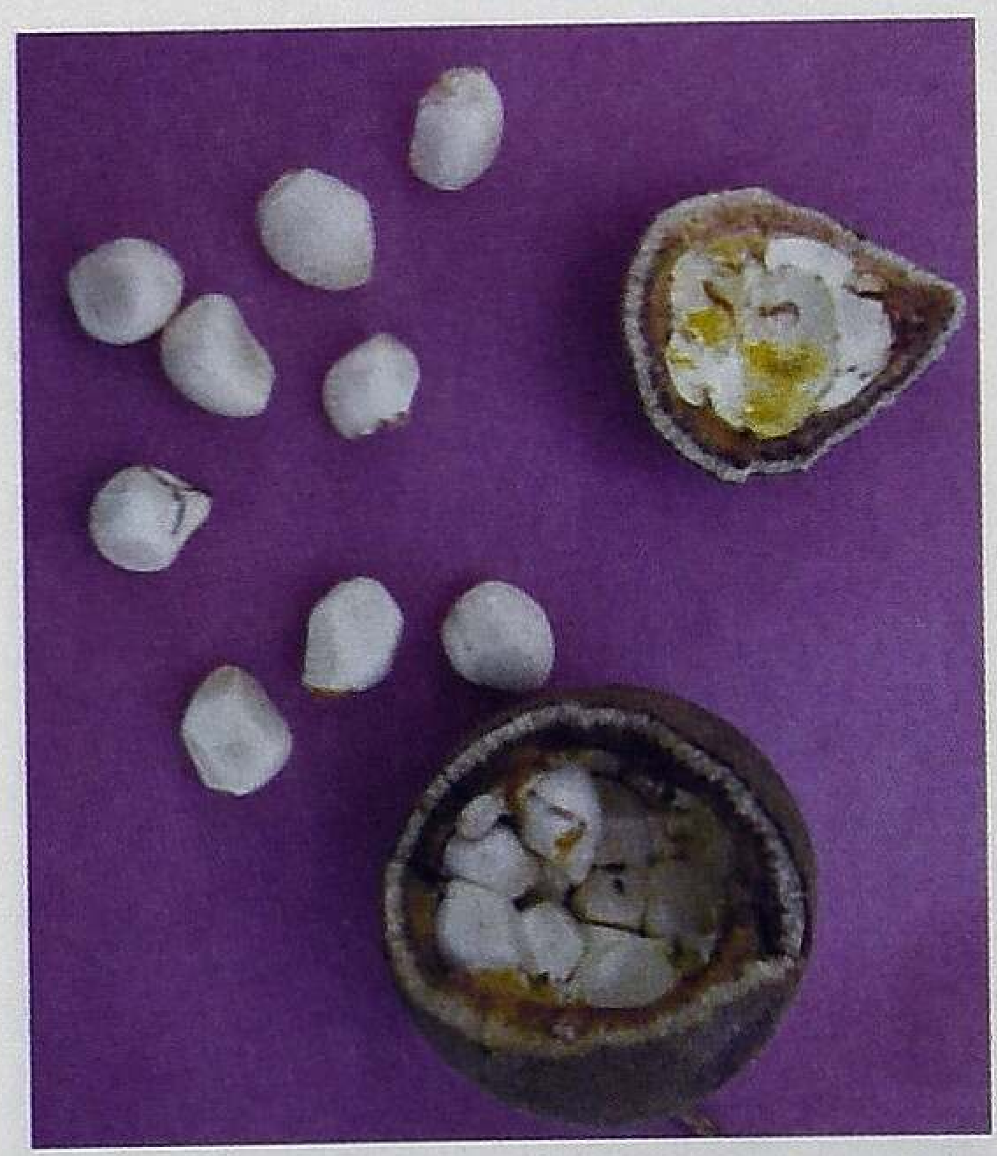
235. *Trifolium repens* L.

236. *Ulex europeaus* L.,

237. *Hydnocarpus alpina* Wight



237a. *Hydnocarpus alpina* Wight



237b. *Hydnocarpus alpina* Wight

PLATE 28

238. *Scolopia crenata* (Wight & Arn.) Clos

239. *Exacum tetragonum* Roxb.

240. *Exacum wightianum* Arn.

241. *Gentiana pedicellata* Wall. ex Griseb. var. *wightii* Kusnezov

242. *Gentiana quadrifaria* Blume var. *zeylanica* (Griseb.) Kusnezov

243. *Halenia perrottetii* Griseb

244. *Swertia angustifolia* Buch.-Ham. var. *pulchella* (Buch.-Ham. ex Clarke) Burkill

245. *Swertia corymbosa* (Griseb.) Wight ex Clarke

246. *Swertia lawii* (Wight ex Clarke) Burkill

PLATE 29

247. *Swertia minor* (Griseb.) Knobl.

248. *Geranium nepalense* Sweet

249. *Aeschynanthus perrottetii* A.DC.

250. *Didymocarpus tomentosa* Wight

251. *Epithema carnosum* (G. Don) Benth. var. *hispida* Clarke

252. *Rhynchoglossum notonianum* (Wall.) Burtt

253. *Ophiopogon intermedius* D. Don

254. *Peliosanthes teta* Andr. ssp. *humilis* (Andr.) Jessop

255. *Laurembergia coccinea* (Blume) Kanitz

PLATE 30

256. *Myriophyllum oliganthum* (Wight & Arn.) F. V. Muell.

257. *Hydrilla verticillata* (L.f.) Royle

258. *Hypericum hookerianum* Wight & Arn.

259. *Hypericum japonicum* Thunb. ex Murr.

260. *Hypericum mysurense* Heyne ex Wight & Arn.

261. *Hypericum wightianum* Wall. ex Wight & Arn.

262. *Curculigo orchioides* Gaertn.

263. *Hypoxis aurea* Lour.

264. *Gomphandra coriacea* Wight

PLATE 31

265. *Nothapodytes nimmoniana* (Graham) Mabb.

265a. *Nothapodytes nimmoniana* (Graham) Mabb.

265b. *Nothapodytes nimmoniana* (Graham) Mabb.

266. *Sisyrinchium rosulatum* E.P. Bicknell

267. *Juncus inflexus* L.

268. *Juncus prismatocarpus* R. Br. ssp. *leschenaultii* (Gay ex Laharpe) Kirschner

269. *Clinopodium umbrosum* (M. Bieb.) K. Koch

270. *Isodon coesta* (Buch.-Ham. ex D. Don) Kudo

271. *Isodon wightii* (Benth.) Hara

PLATE 32

272. *Leucas beddomei* (Hook. f.) Sunojk & Mathew

273. *Leucas helianthemifolia* Desf.

274. *Leucas hirta* (Heyne ex Roth) Spreng.

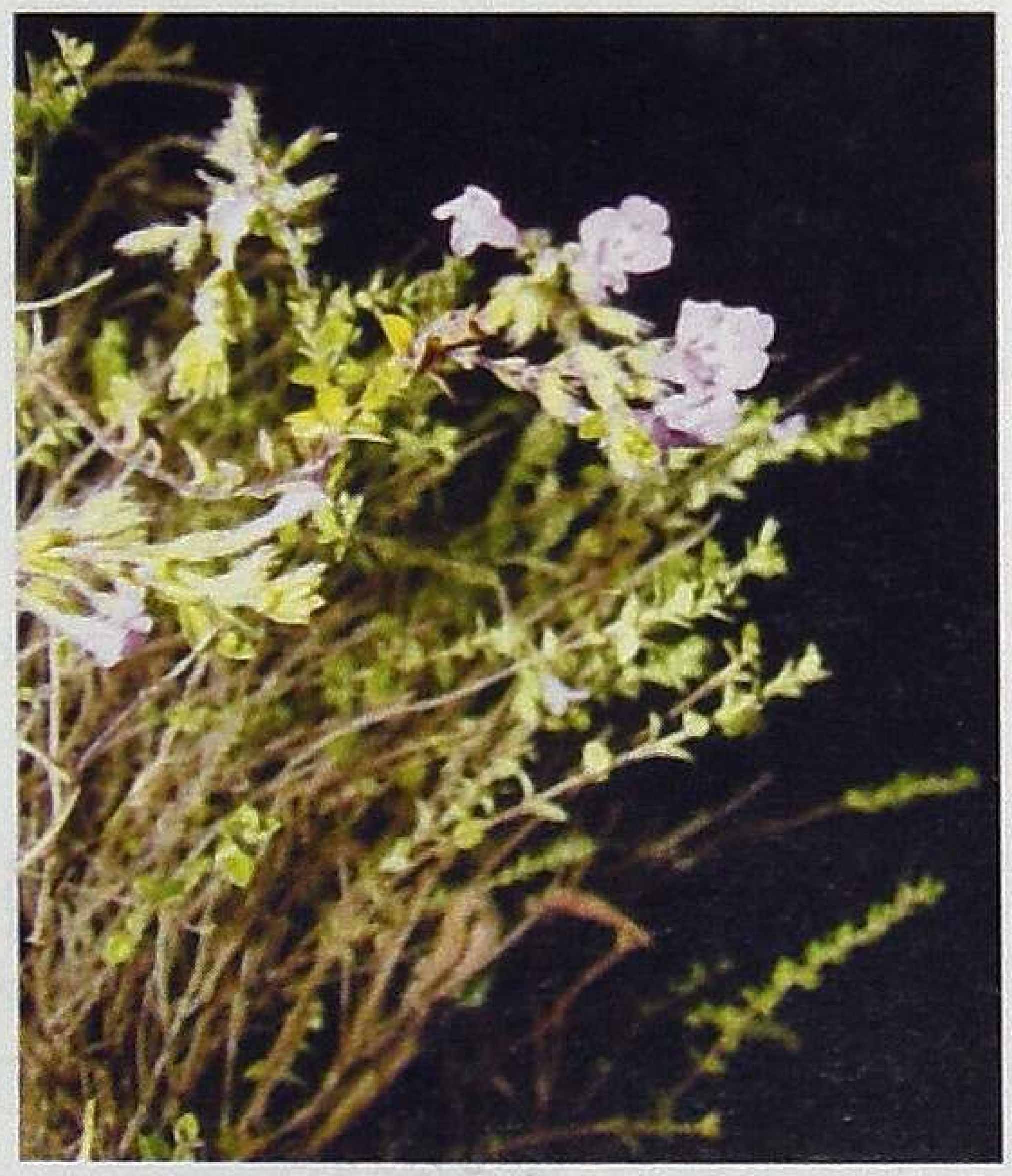
275. *Leucas lamiifolia* Desf.

276. *Leucas lanceifolia* Desf.

277. *Leucas rosmarinifolia* Benth.

278. *Leucas sebaldiana* Sunojk.

279. *Leucas suffruticosa* Benth.



280. *Micromeria imbricata* (Forssk.) C.Chr.

PLATE 33

281. *Plectranthus barbatus* Andr.

282. *Plectranthus glabratus* (Benth.) Alston

283. *Pogostemon auricularius* (L.) Hassk.

284. *Pogostemon benghalensis* (Burm. f.) O. Ktze.

285. *Pogostemon mollis* Benth.

286. *Pogostemon pubescens* Benth.

287. *Pogostemon speciosus* Benth.

288. *Pogostemon wightii* Benth.

289. *Salvia leucantha* Cav.

PLATE 34

290. *Scutellaria barbata* D. Don

291. *Scutellaria violacea* Heyne ex Benth.

292. *Scutellaria wightiana* Benth.

293. *Teucrium tomentosum* Heyne ex Benth.

294. *Actinodaphne bourdillonii* Gamble

295. *Actinodaphne Actinodaphne* bourneae Gamble

296. *Actinodaphne campanulata* Hook. f. var. *campanulata*

297. *Actinodaphne campanulata* Hook.f. var. *obtusa* Gamble

298. *Actinodaphne lawsonii* Gamble (2)

PLATE 35

299. *Actinodaphne salicina* Meisner

300. *Apollonias arnottii* Nees

301. *Beilschmiedia wightii* (Nees) Benth. ex Hook. f.

302. *Cinnamomum sulphuratum* Nees

303. *Cinnamomum wightii* Meisner

304. *Cryptocarya lawsonii* Gamble

305. *Cryptocarya neilgherrensis* Meisner

306. *Litsea floribunda* (Blume) Gamble

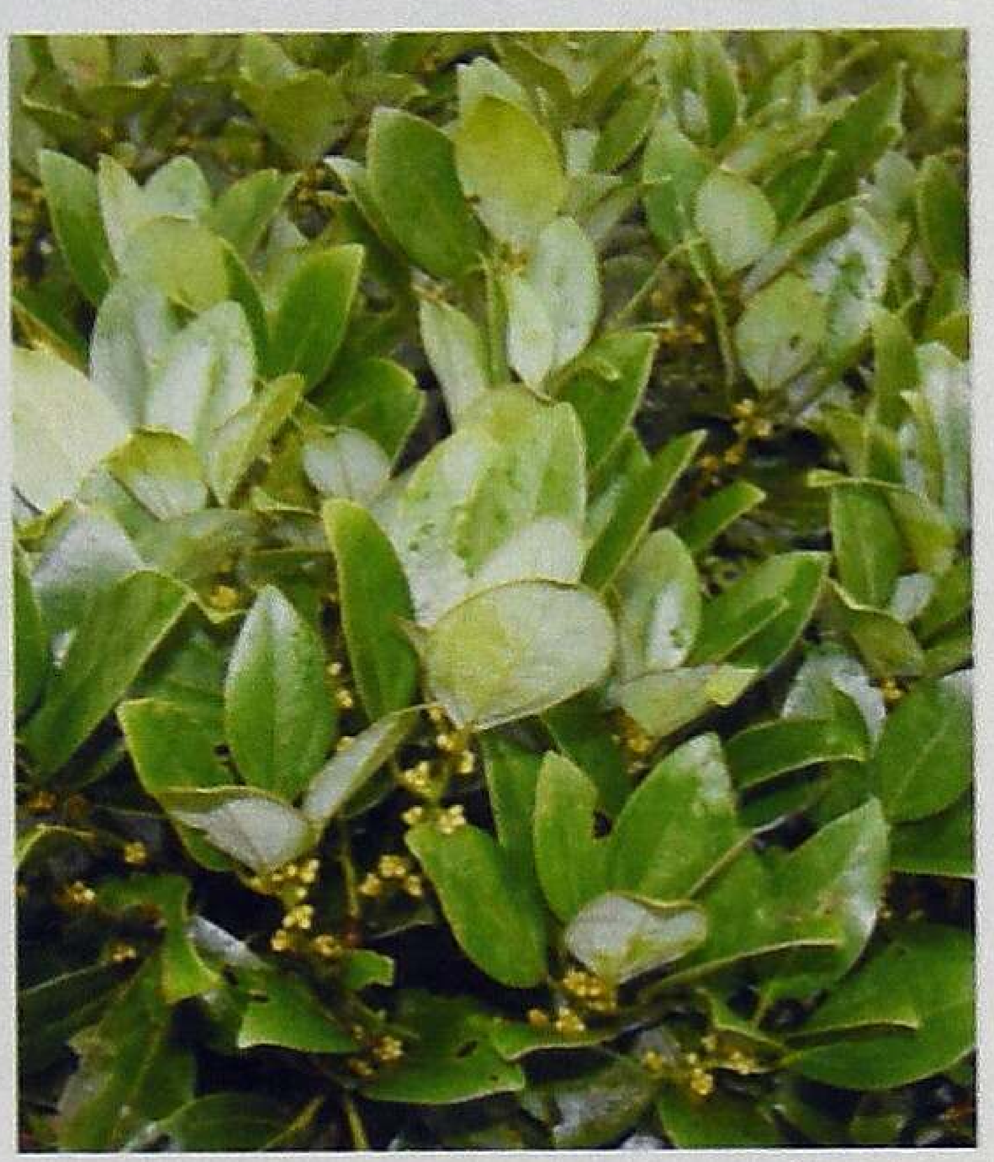
307. *Litsea myristicaefolia* (Wall. ex Nees) Hook.f.

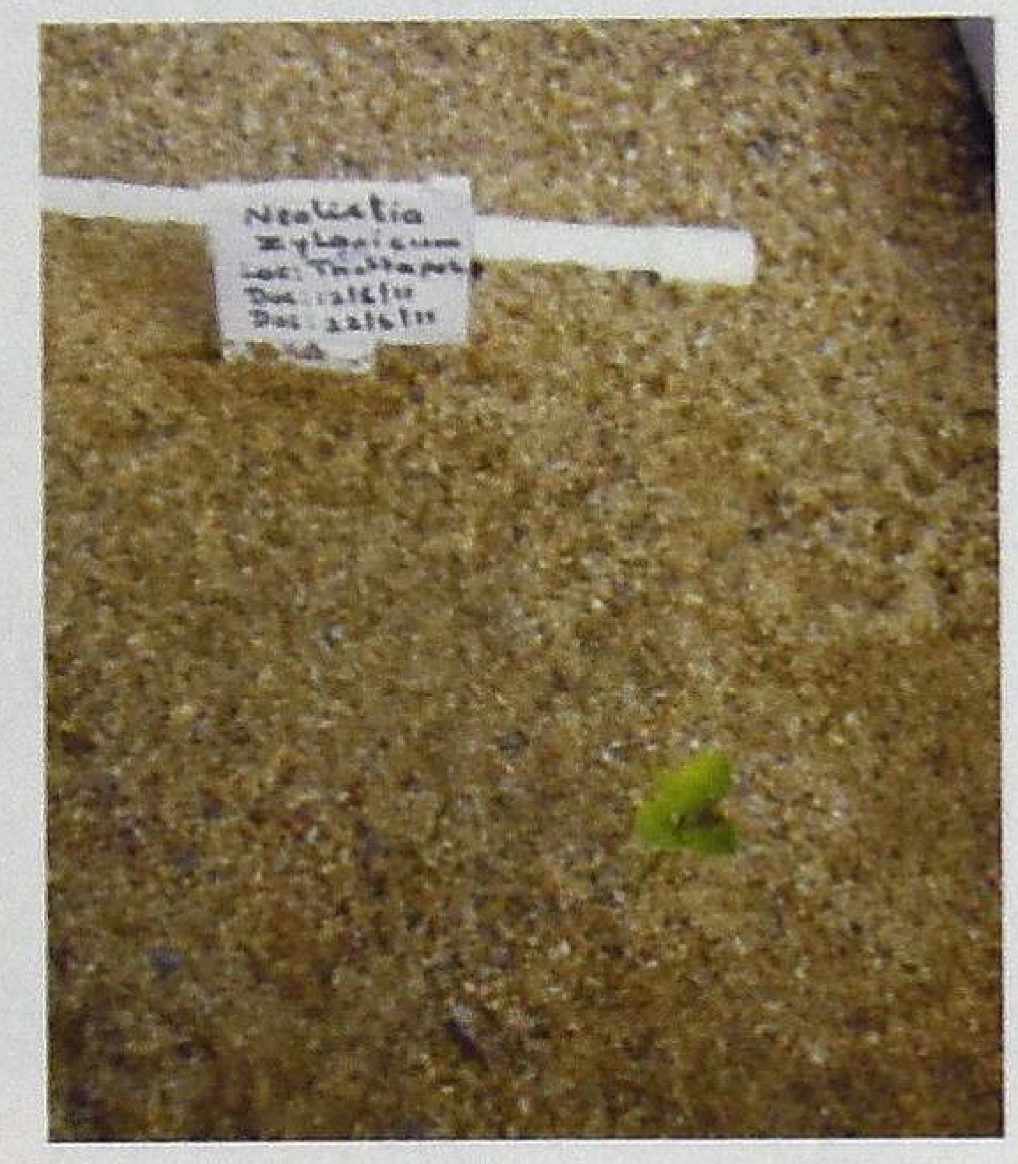
PLATE 36

308. *Litsea quinqueflora* (Dennst.) Suresh

309. *Litsea wightiana* (Nees) Hook. f.

309 a. *Litsea wightiana* (Nees) Hook. f.


310. *Neolitsea cassia* (L.) Kosterm.


310a. *Neolitsea cassia* (L.) Kosterm.

311. *Neolitsea scrobiculata* (Meisner) Gamble

312. *Phoebe wightii* Meisner

313. *Utricularia caerulea* L.

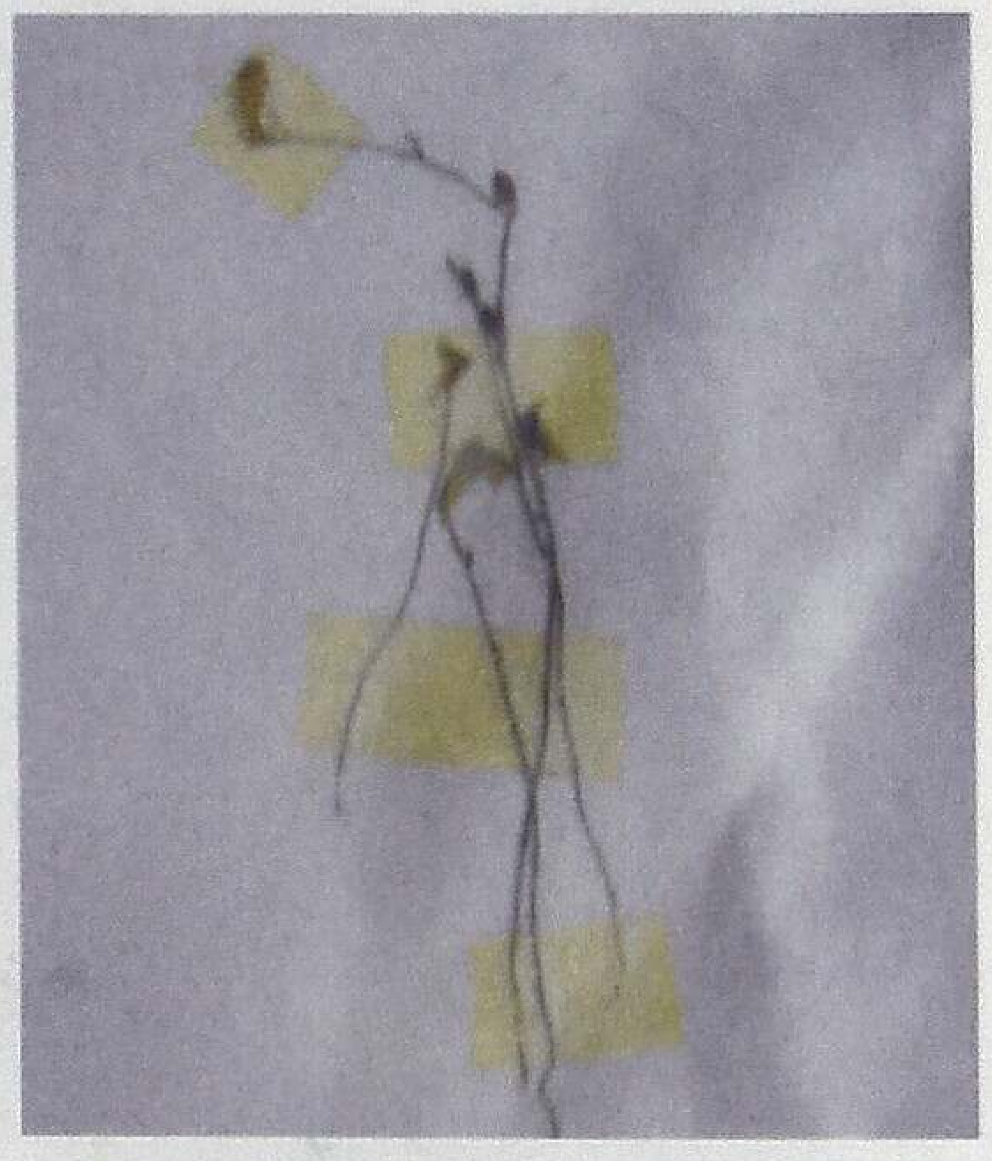

314. *Utricularia scandens* Benj.

PLATE 37

315. *Asparagus fysonii* Macbr.

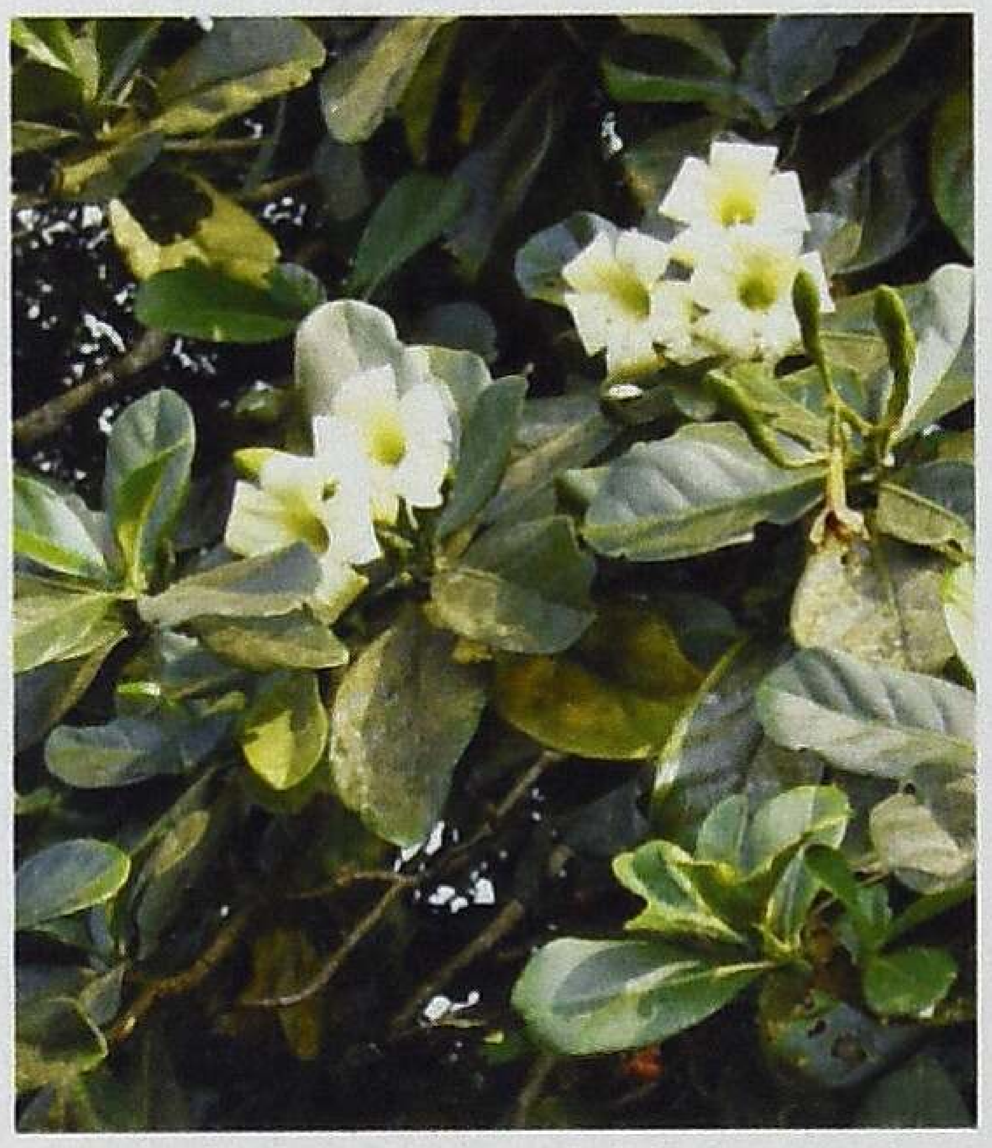
316. *Chlorophytum malabaricum* Baker

317. *Disporum leschenaultianum* D. Don

318. *Lilium wallichianum* Schult. & Schult. f. var. *neilgherrense* (Wight) Hara

319. *Linum mysorense* Heyne ex Benth.

320. *Lobelia leschenaultiana* (Presl) Skottsb.



321. *Fagraea ceilanica* Thunb.

322. *Gardneria ovata* Wall.

323. *Dendrophthoe neelgherrensis* (Wight & Arn.) Tieghem

PLATE 38

324. *Dendrophthoe trigona* (Wight & Arn.) Danser ex Sant.

325. *Helixanthera obtusata* (Schult.) Danser

326. *Macrosolen parasiticus* (L.) Danser

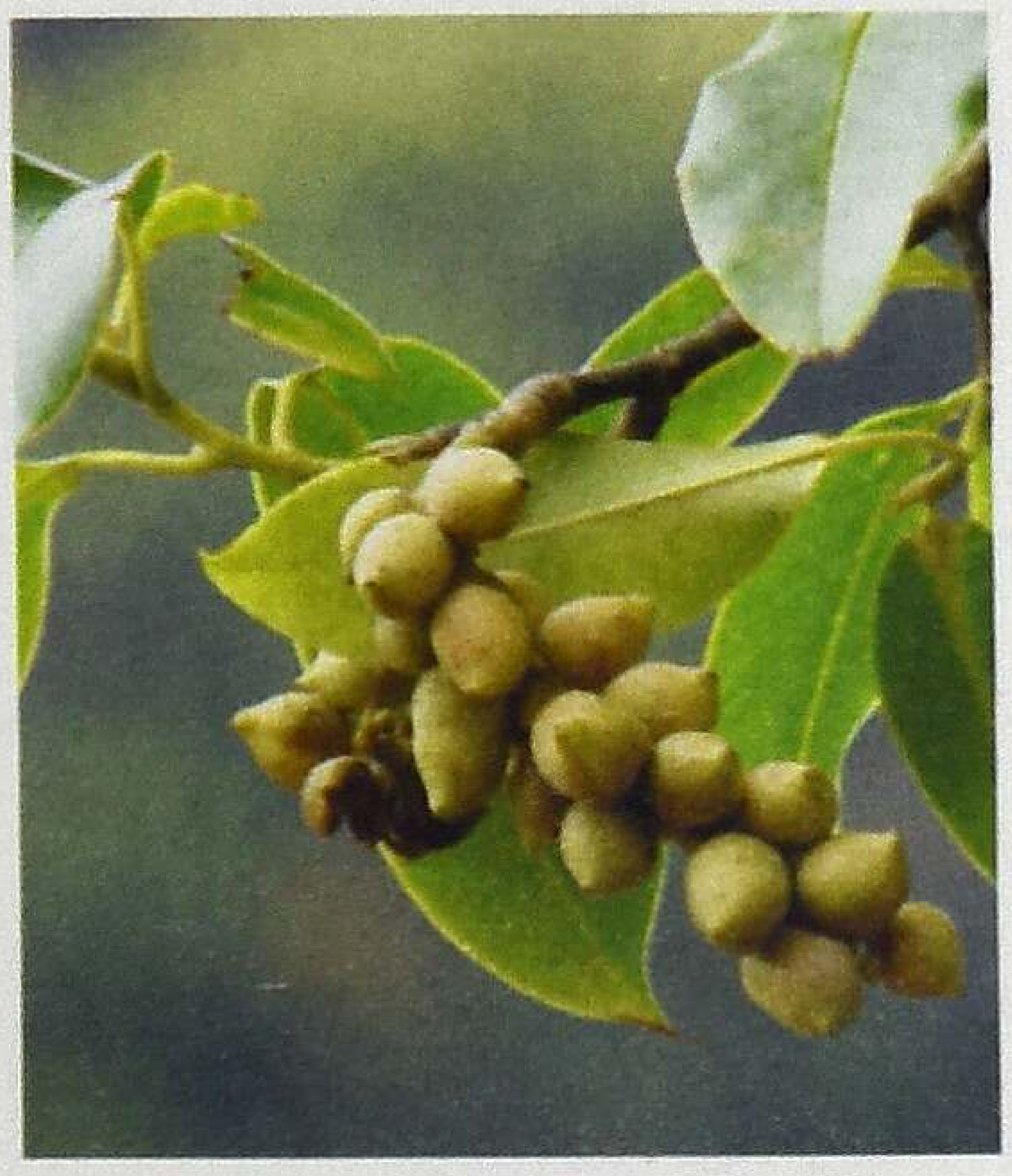
327. *Taxillus cuneatus* (Heyne ex Roth) Danser

328. *Taxillus recurvus* (DC.) Teighen

329. *Taxillus tomentosus* (Heyne ex Roth) Tieghem

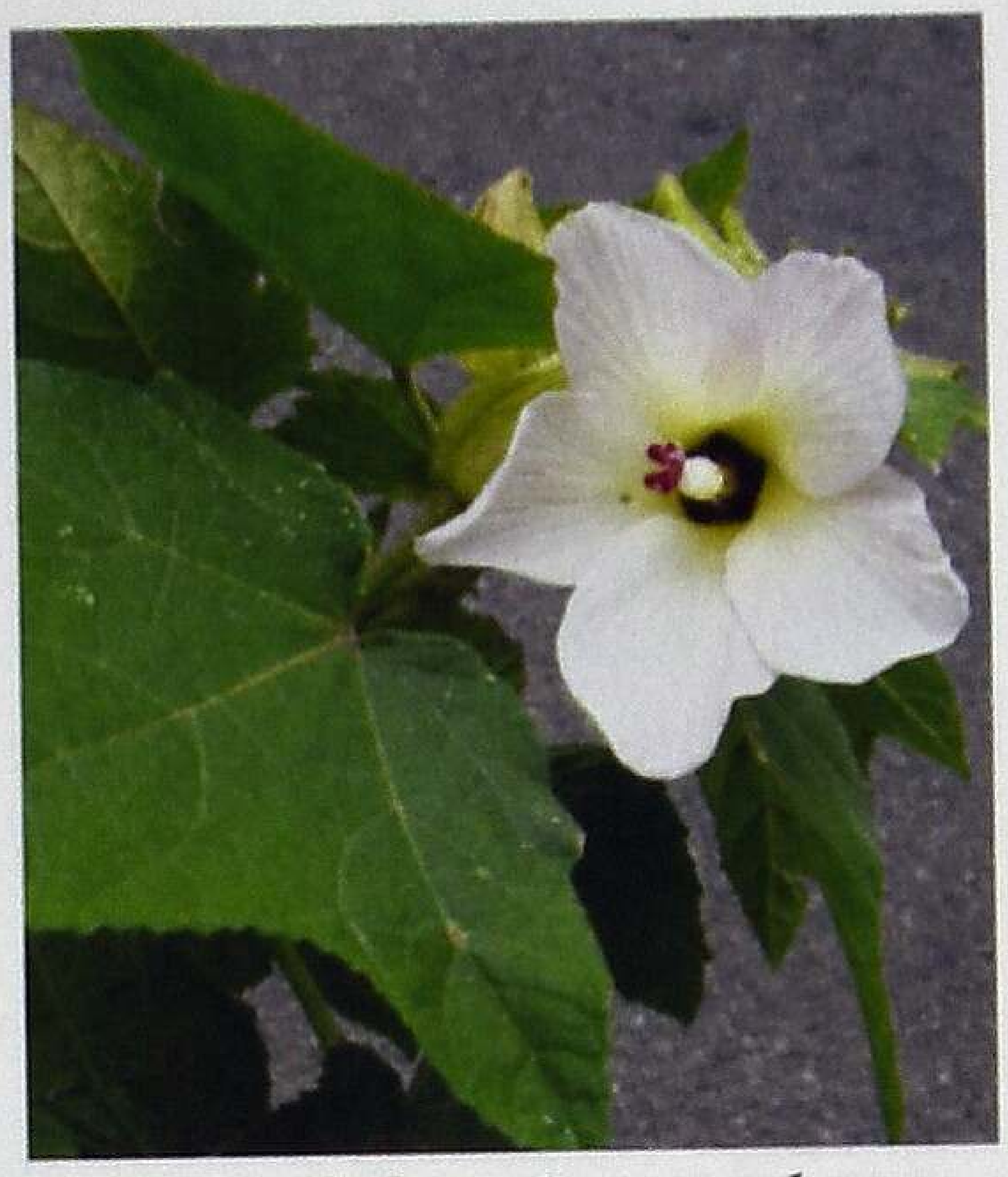
330. *Rotala rotundifolia* (Buch.-Ham. ex Roxb.) Koehne

331. *Magnolia nilagirica* (Zenk.) Figlar

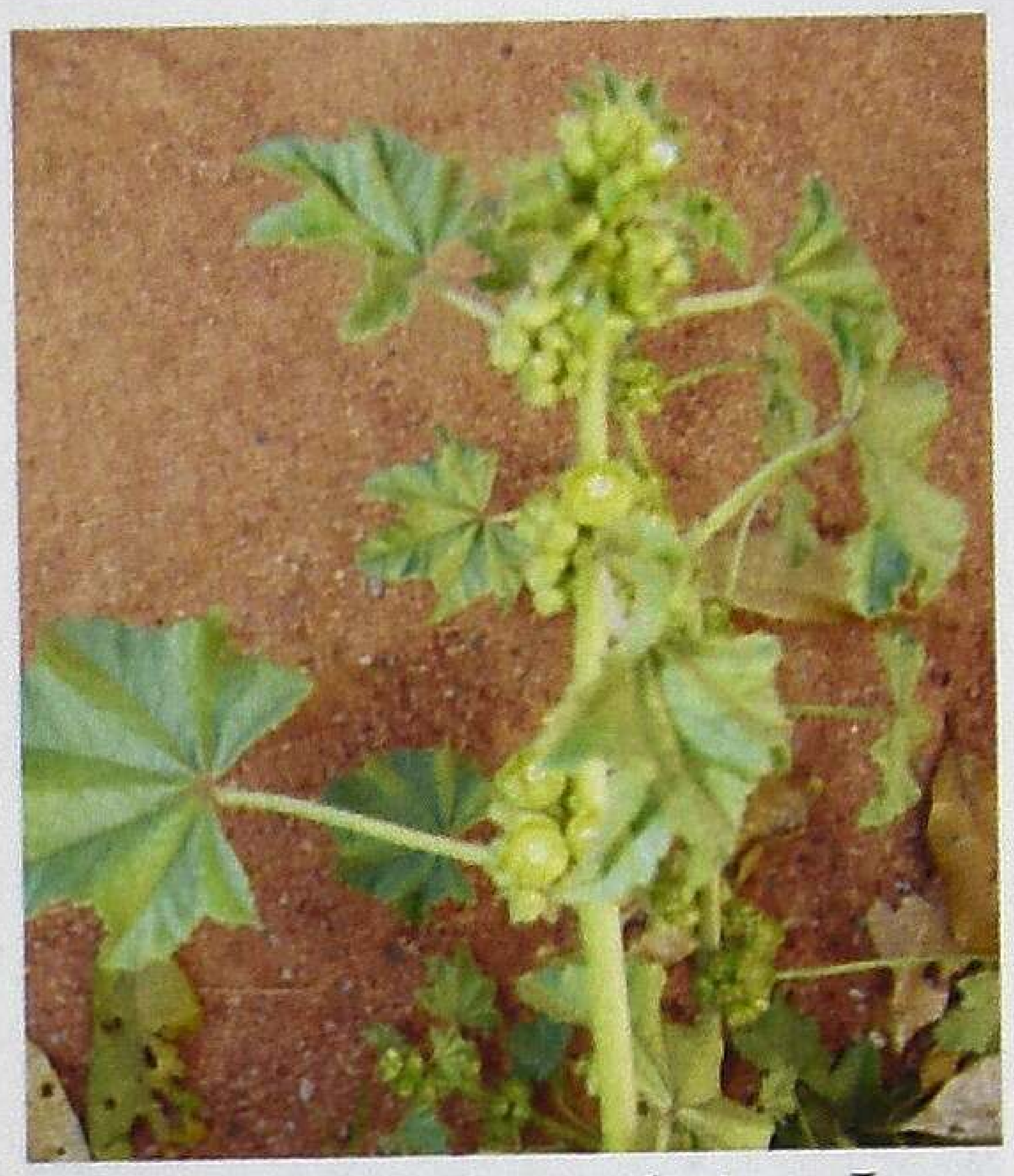


331 a. *Magnolia nilagirica* (Zenk.) Figlar

PLATE 39


332. *Abelmoschus angulosus* Wall. ex Wight & Arn. var. *angulosus*

333. *Abelmoschus angulosus* Wall. ex Wight & Arn. var. *purpureus* Thw.


334. *Modiola caroliniana* L.

335. *Sida rhomboidea* Roxb. ex Fleming

336. *Urena lobata* L.

337. *Memecylon randerianum* SM & MR Almeida

338. *Memecylon sisparense* Gamble

339. *Osbeckia aspera* (L.) Blume

340. *Osbeckia brachystemon* Naud.

PLATE 40

341. *Osbeckia cupularis* D.Don ex Wight & Arn.

342. *Osbeckia gracilis* Bedd.

343. *Osbeckia reticulata* Bedd.

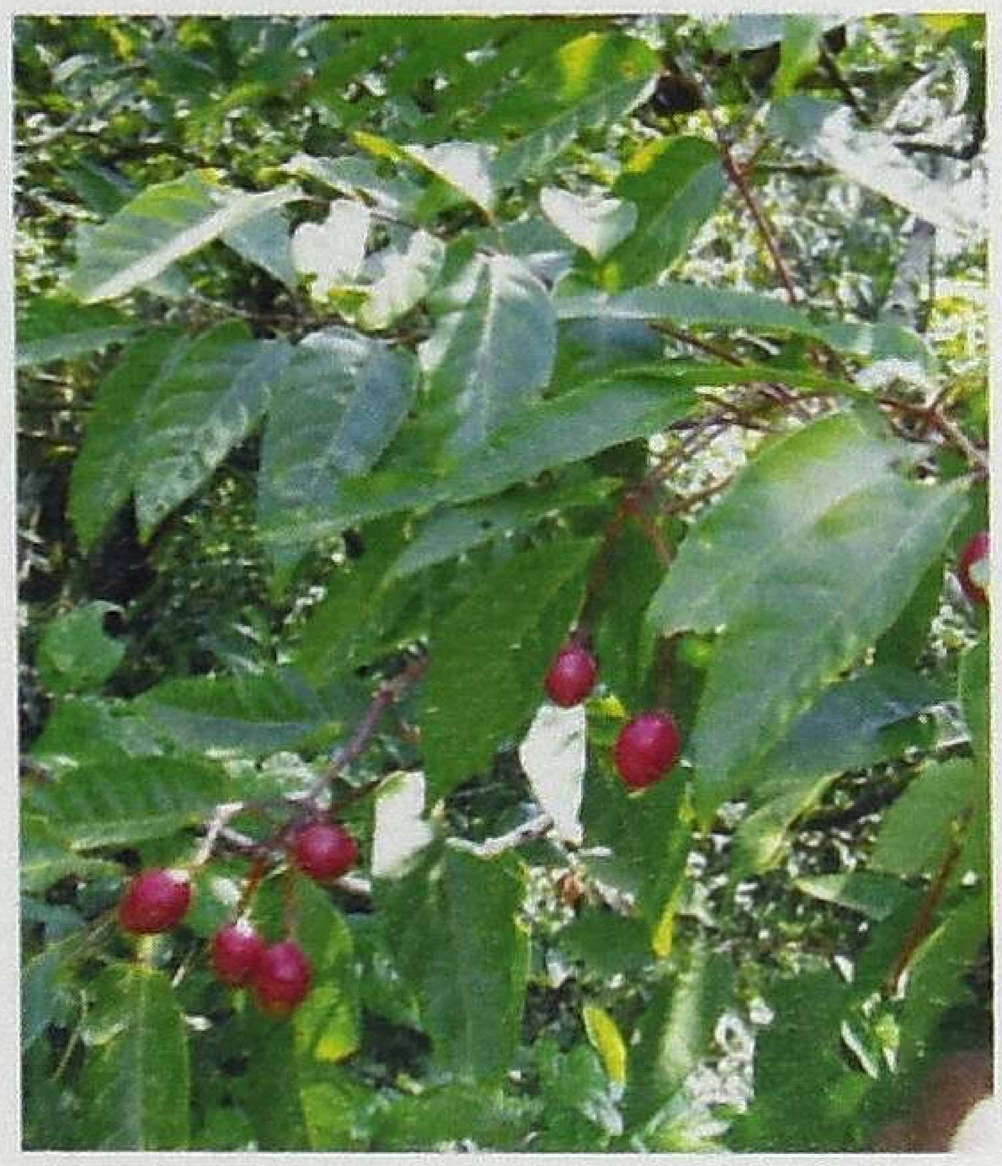
344. *Sonerila grandiflora* R. Br. ex Wight & Arn.

345. *Sonerila speciosa* Zenk.

346. *Sonerila wallichii* Bennett

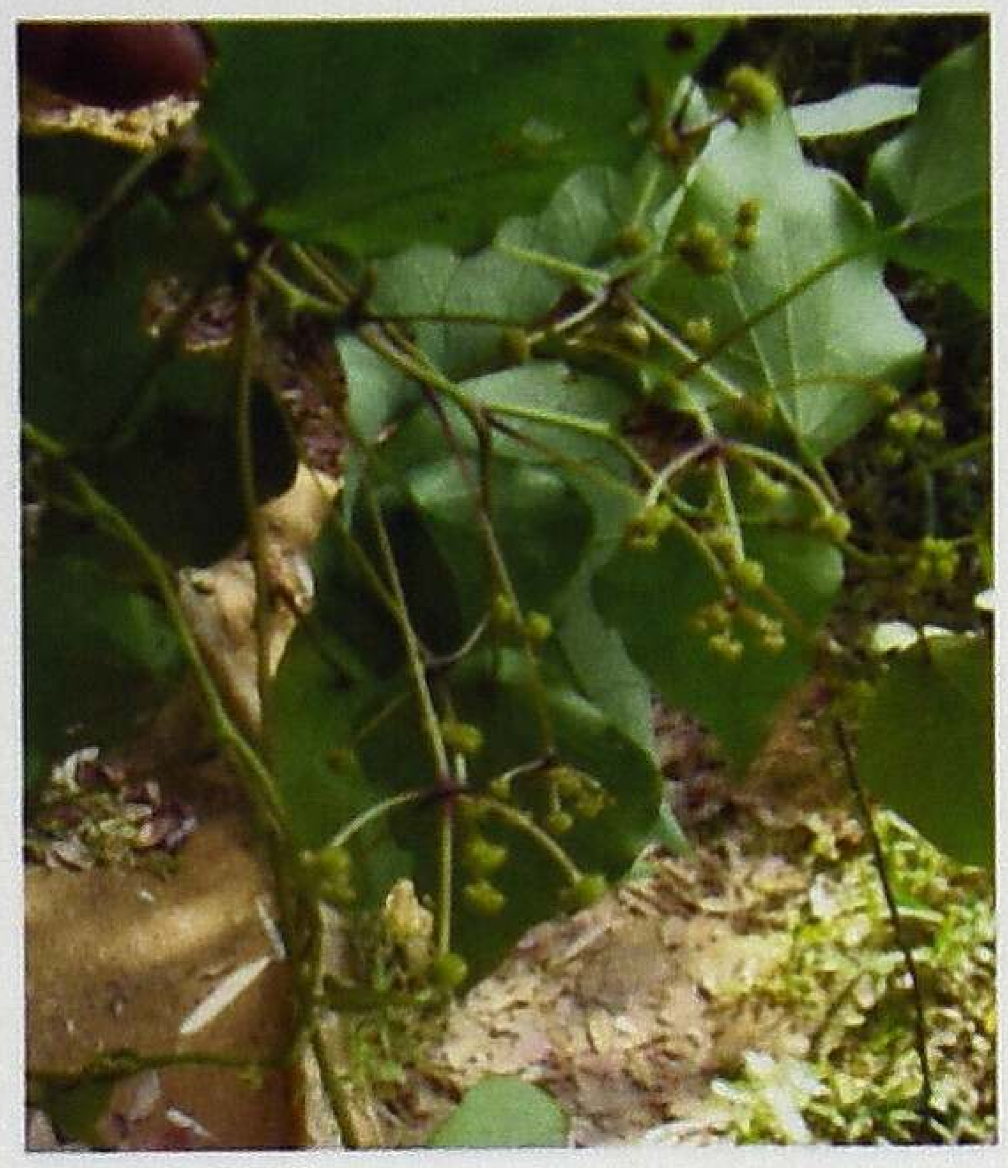
347. *Aglaia bourdillonii* Gamble

348. *Aphanamixis polystachya* (Wall.) Parker

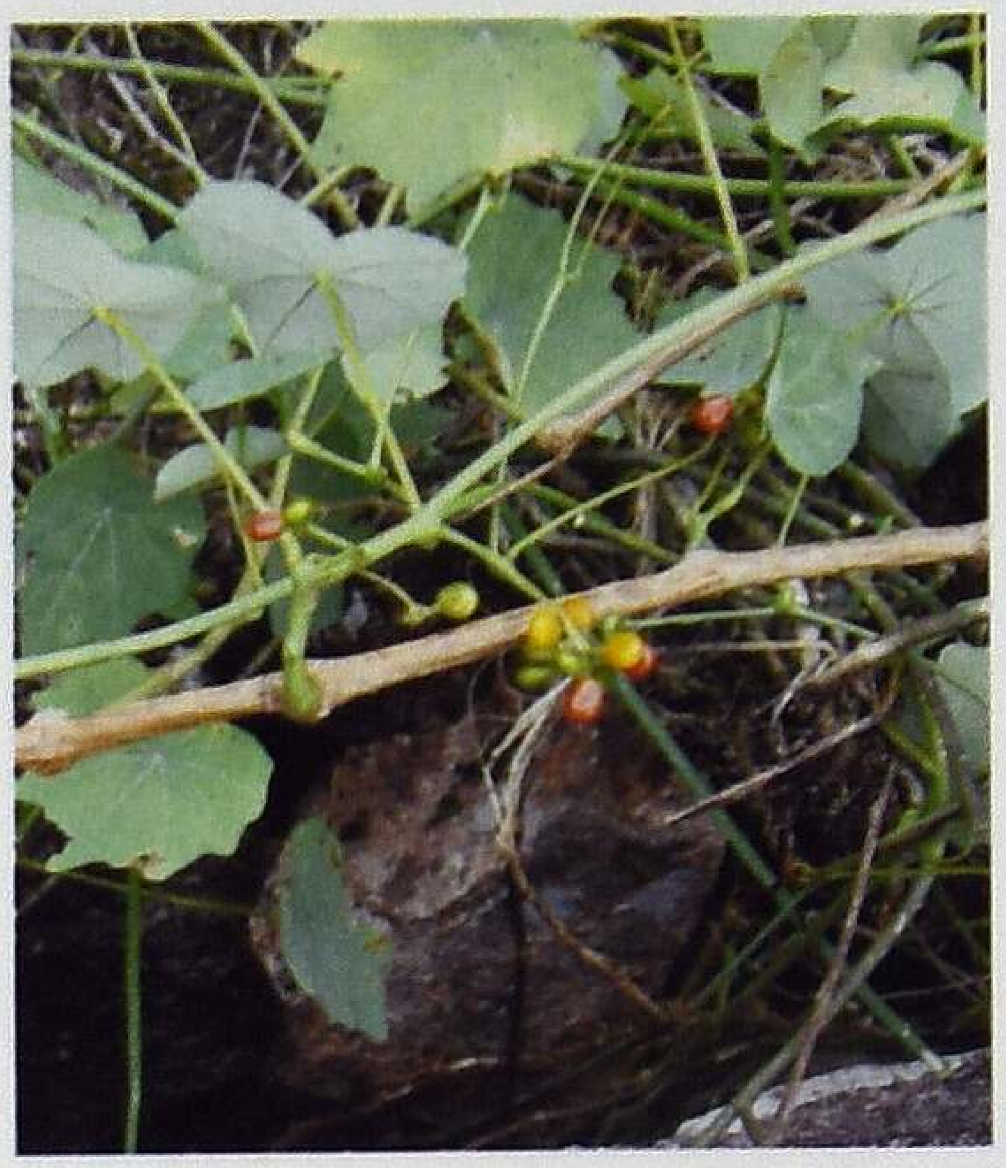


349. *Trichilia connaroides* (Wight & Arn.) Bentv.

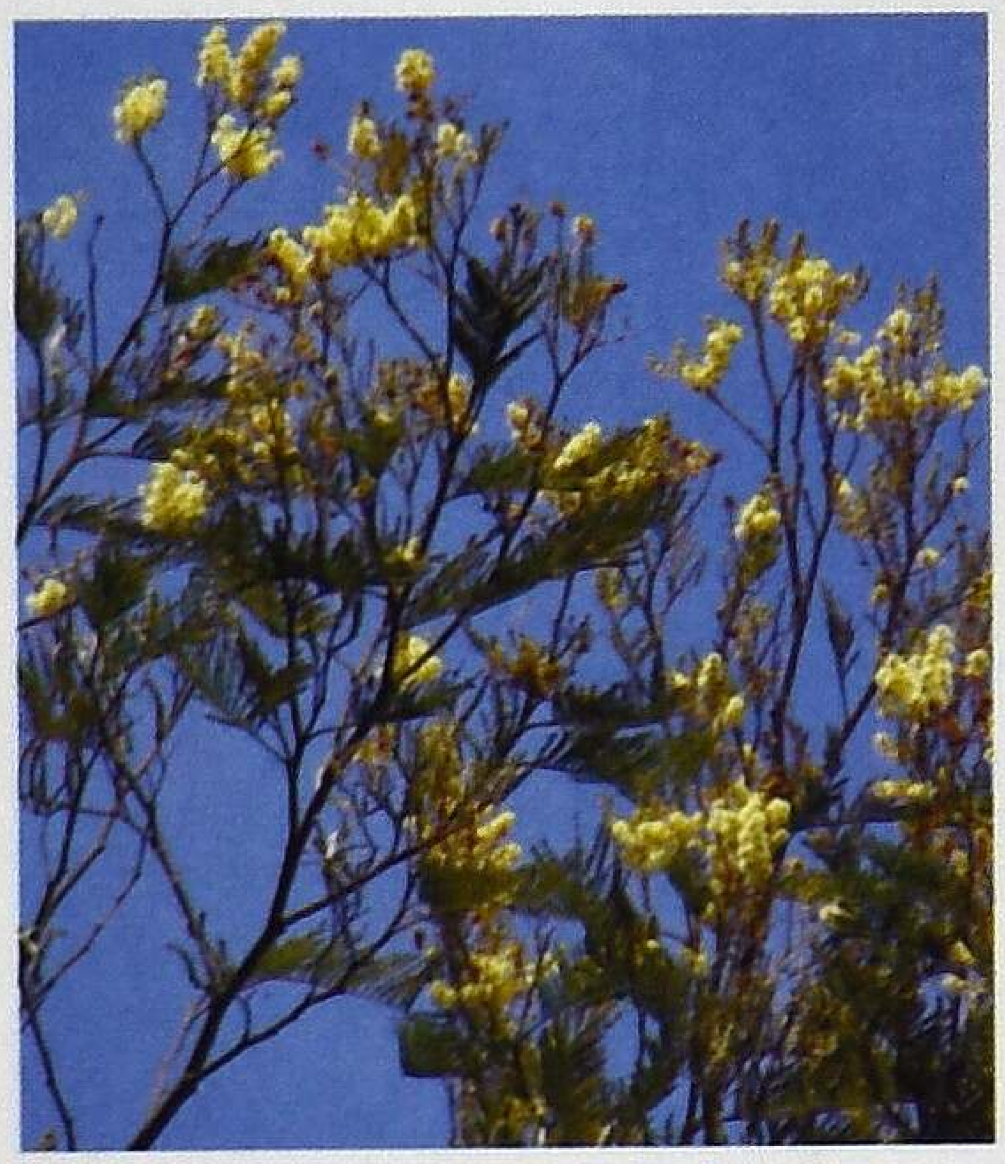
PLATE 41



350. *Stephania japonica* (Thunb.) Miers



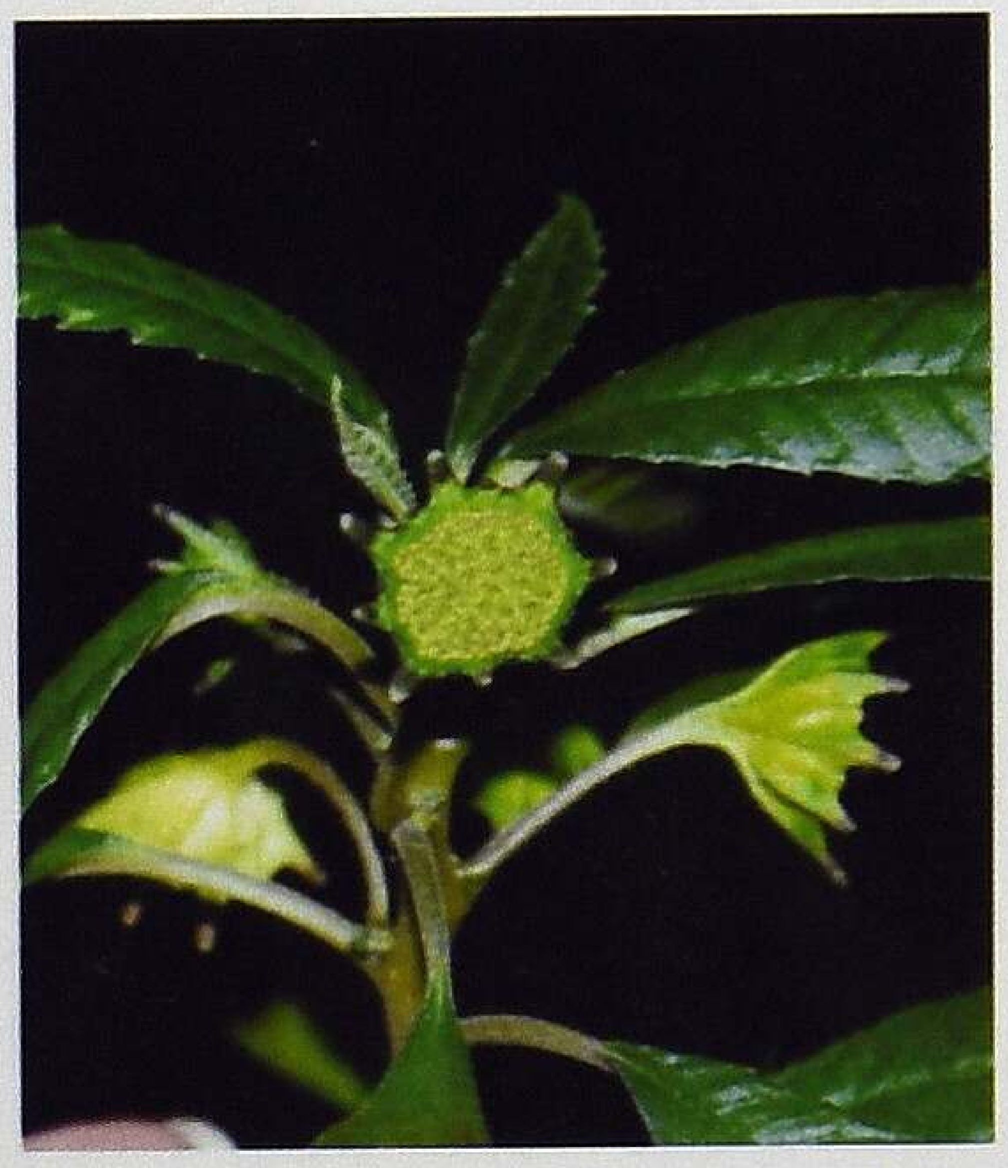
351. *Stephania wightii* (Arn.) Dunn



352. *Acacia dealbata* Link

353. *Acacia mearnsii* Wilde

354. *Racosperma melanoxylon* (R.Br.) Pedley



355. *Dorstenia indica* Wall. ex Wight

356. *Ficus laevis* Blume var. *macrocarpa* (Miq.) Corner

357. *Ardisia pauciflora* Heyne ex Roxb.,

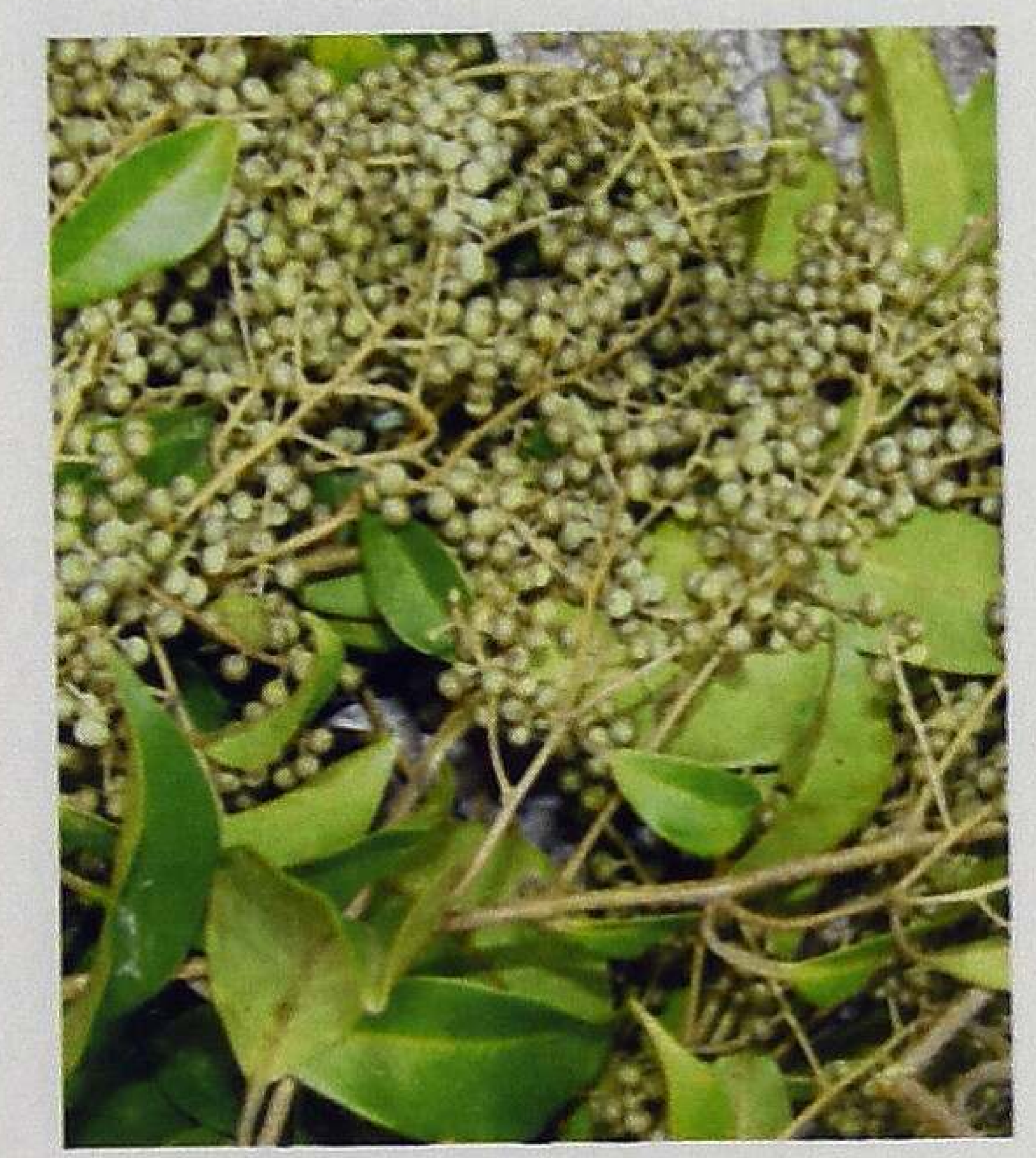
358. *Ardisia rhomboidea* Wight

PLATE 42

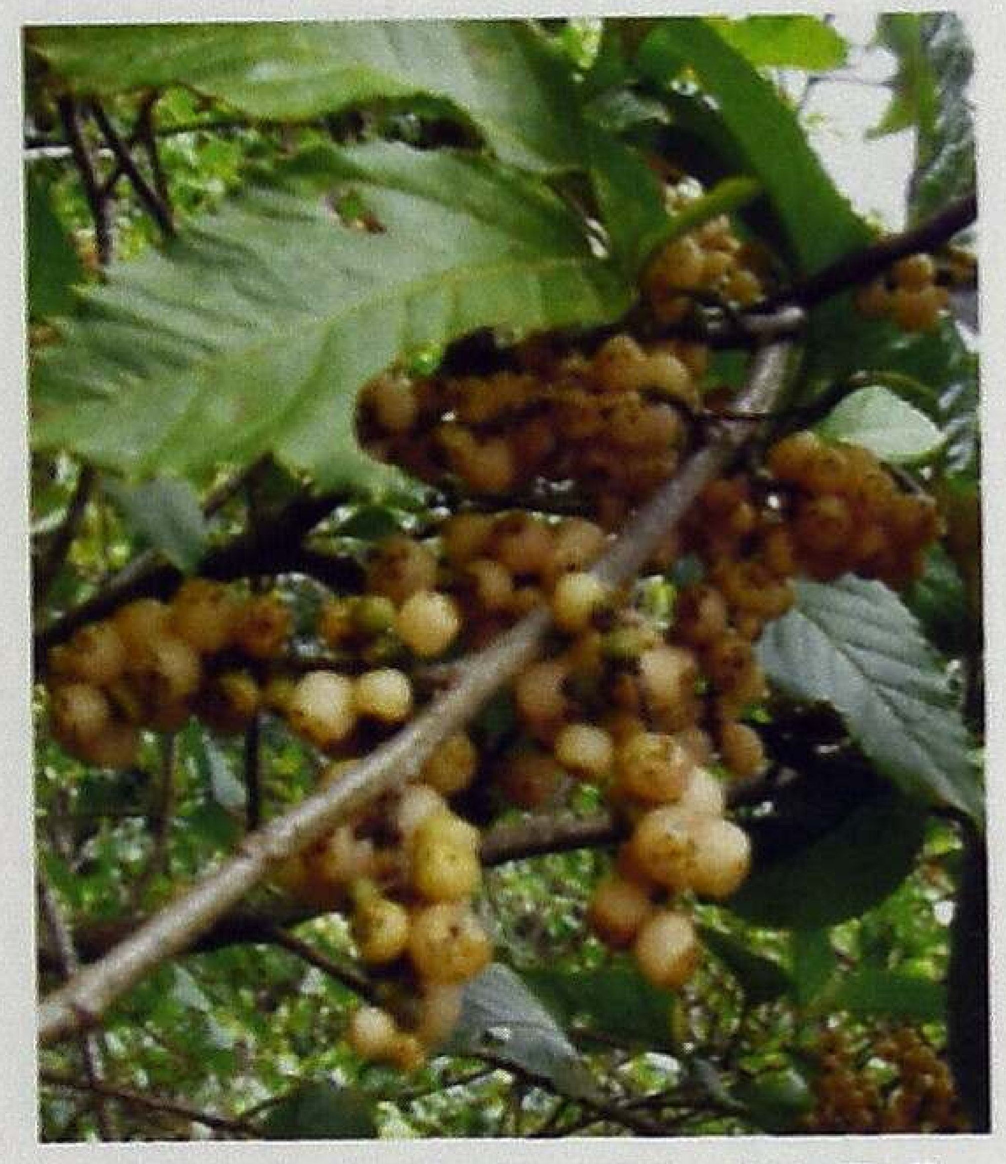
359. *Ardisia sonchifolia* Mez

360. *Embelia adnata* Bedd. ex Clarke

361. *Embelia gardneriana* Wight



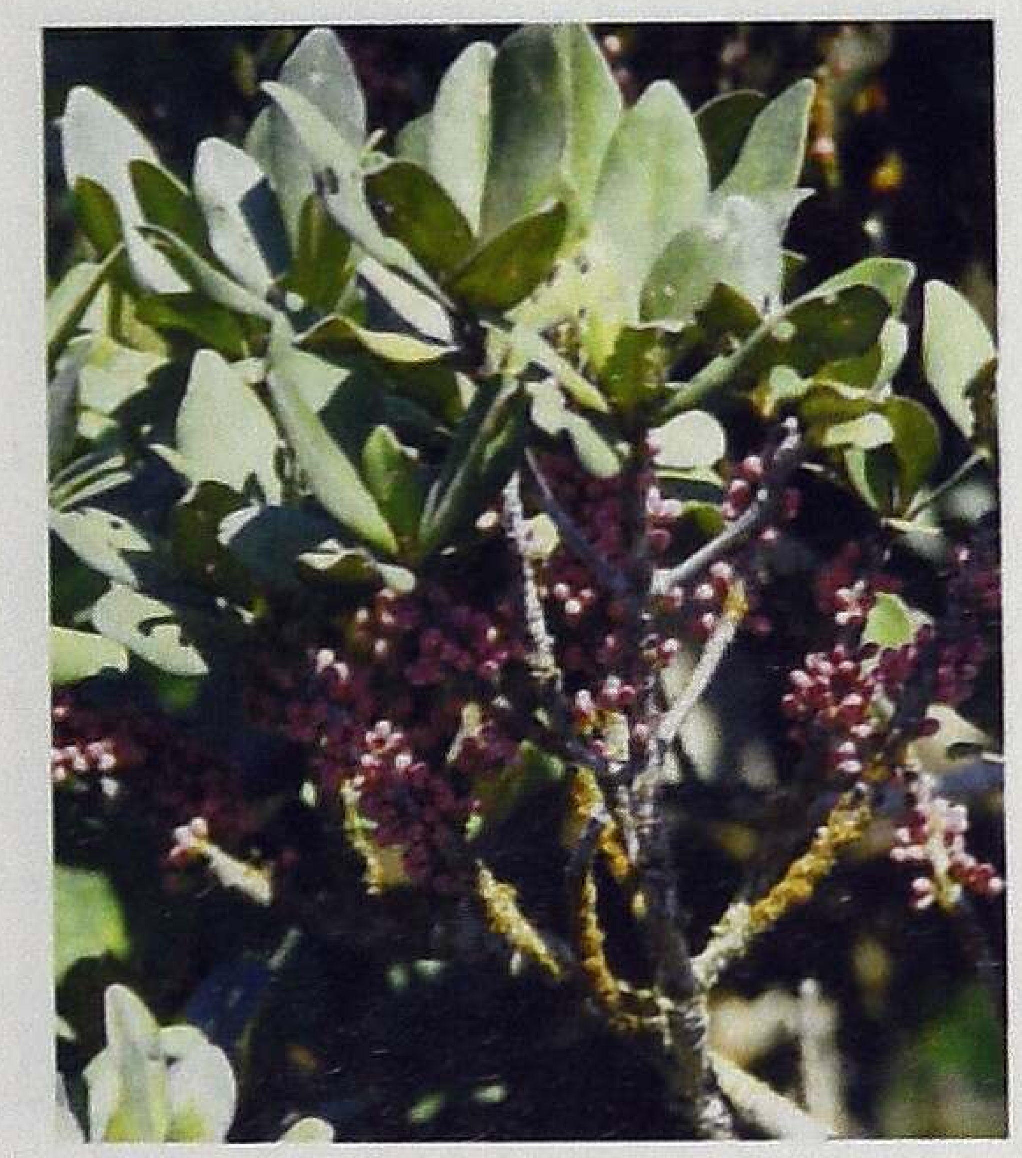
362. *Embelia ribes* Burm. f.



363. *Maesa indica* (Roxb.) DC.

364. *Myrsine wightiana* Wall. ex DC.

365. *Rapanea capitellata* (Wall.) Mez



366. *Rapanea daphnoides* Mez

367. *Eucalyptus globulus* Labill.

PLATE 43

368. *Eucalyptus grandis* Hill ex Maid

369. *Rhodomyrtus tomentosa* (Sol. ex Ait.) Hassk.

370. *Syzygium calophyllifolium* Walp.

371. *Syzygium cumini* (L.) Skeels

372. *Syzygium densiflorum* Wall. ex Wight & Arn.

372a. *Syzygium densiflorum* Wall. ex Wight & Arn.

373. *Syzygium grande* (Wight) Walp.

374. *Syzygium hemisphericum* (Wight) Alston

375. *Syzygium lanceolatum* (Lam.) Wight & Arn.

PLATE 44

376. *Nymphaea nouchali* Burm.f.

377. *Chionanthus ramiflorus* Roxb.

378. *Jasminum bignoniaceum* Wall. ex A. DC.

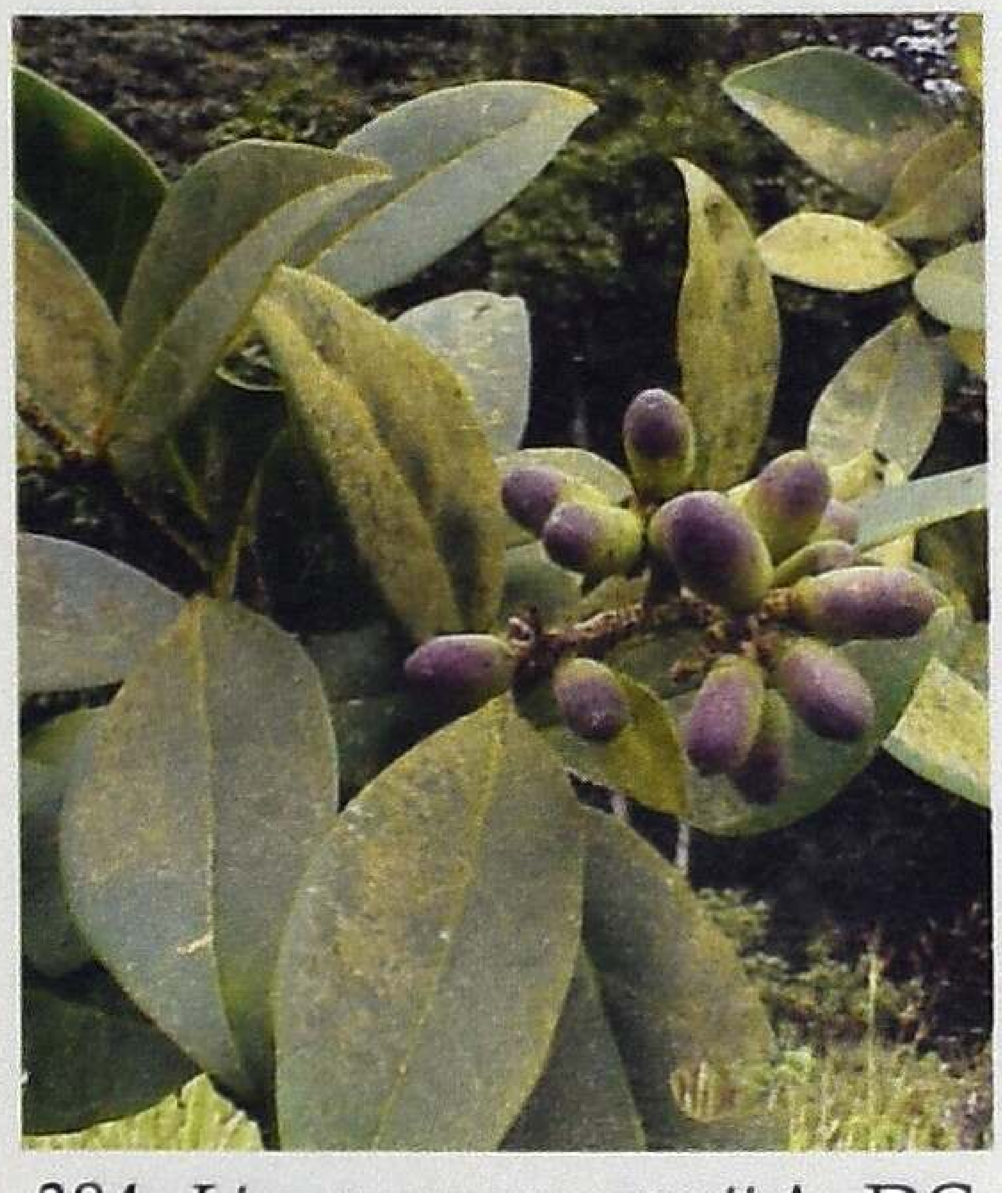
379. *Jasminum brevilobum* A. DC.

380. *Jasminum coarctatum* Roxb.

381. *Jasminum cuspidatum* Rottl.

382. *Jasminum flexile* Vahl

383. *Jasminum mesnyi* Hance

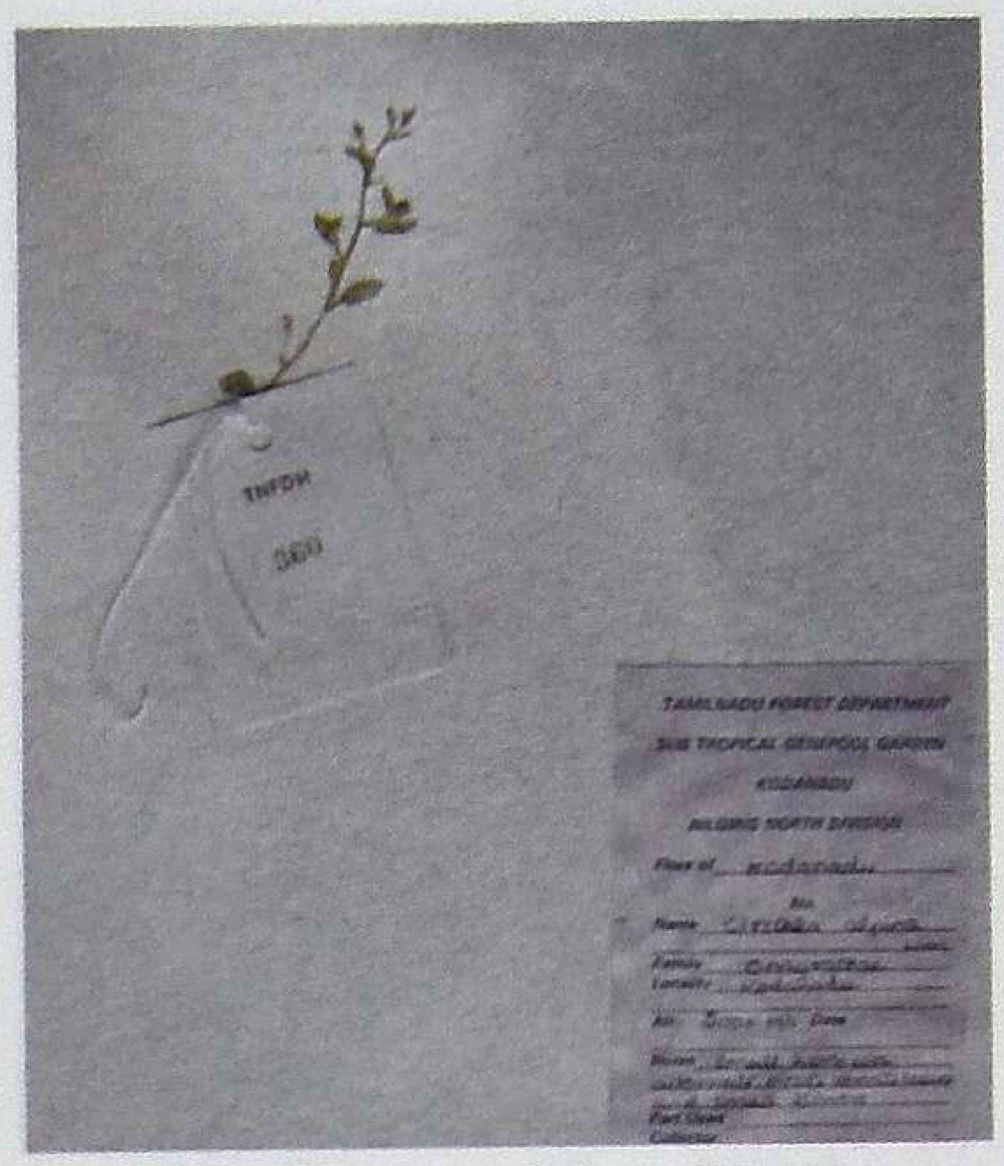


384. *Ligustrum perrottetii* A. DC.

PLATE 45

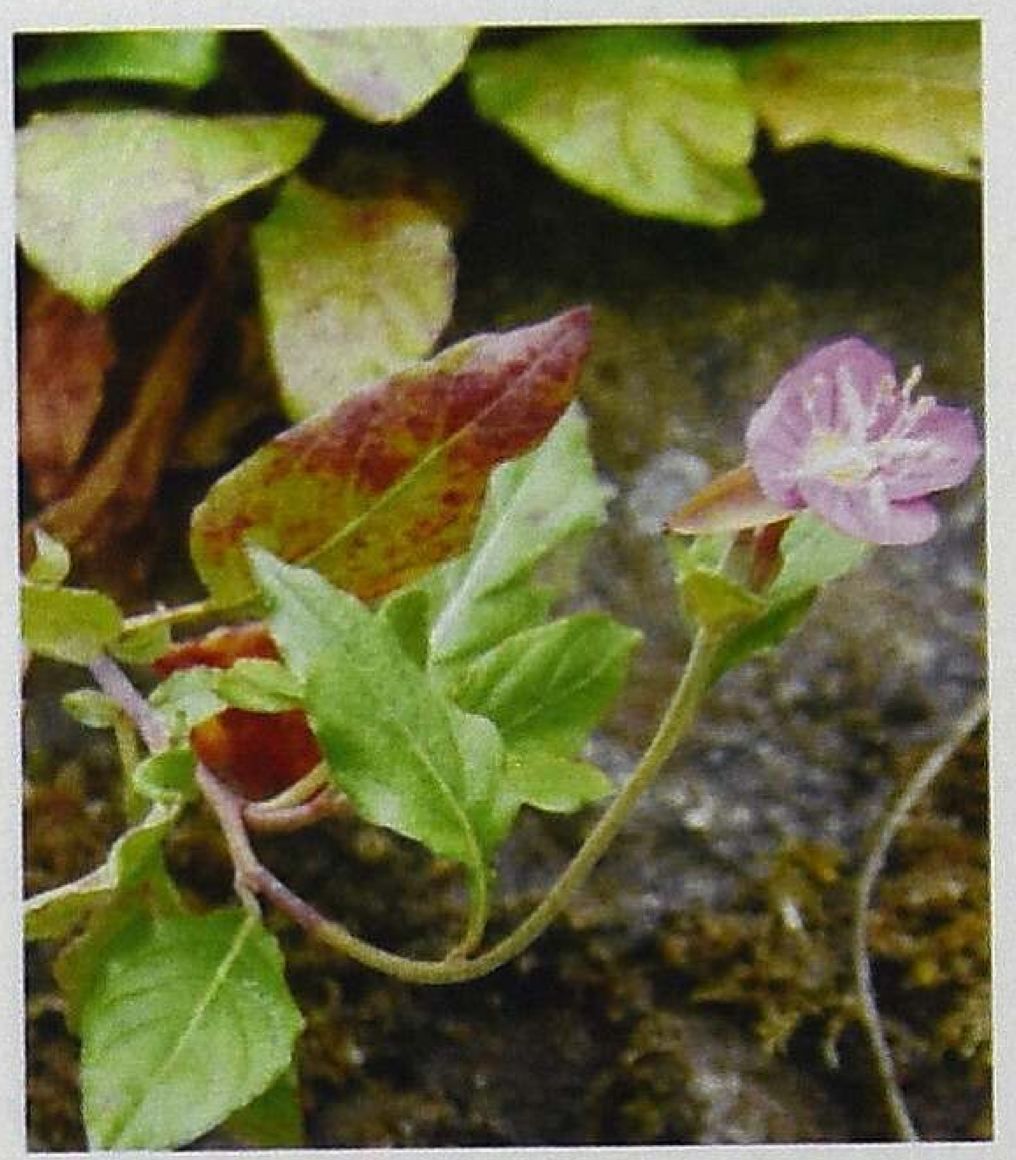
385. *Ligustrum robustum* (Roxb.) Blume ssp. *walkeri* (Decne.) P. S. Green

386. *Olea paniculata* R. Br.



387. *Circaea alpinia* L. ssp. *imaicola* (Asch. & Magn.) Kitamura

388. *Ludwigia octovalvis* (Jacq.) Raven ssp. *sessiliflora* (Michx.) Raven



389. *Oenothera rosea* Ait.

390. *Aerides crispa* Lindl.

391. *Aerides ringens* (Lindl.) C.E.C. Fisch.

392. *Bulbophyllum elegantulum* (Rolfe) J. J. Smith

393. *Calanthe sylvatica* (Thouars) Lindl.

PLATE 46

394. *Cheirostylis flabellata* (A. Rich.) Wight

395. *Cleisostoma tenuifolium* (L.) Garay

396. *Coelogyne mossiae* Rolfe

397. *Coelogyne nervosa* A. Rich.

398. *Coelogyne odoratissima* Lindl.

399. *Conchidium braccatum* (Lindl.) Brieger

400. *Conchidium nanum* (A.Rich.) Brieger

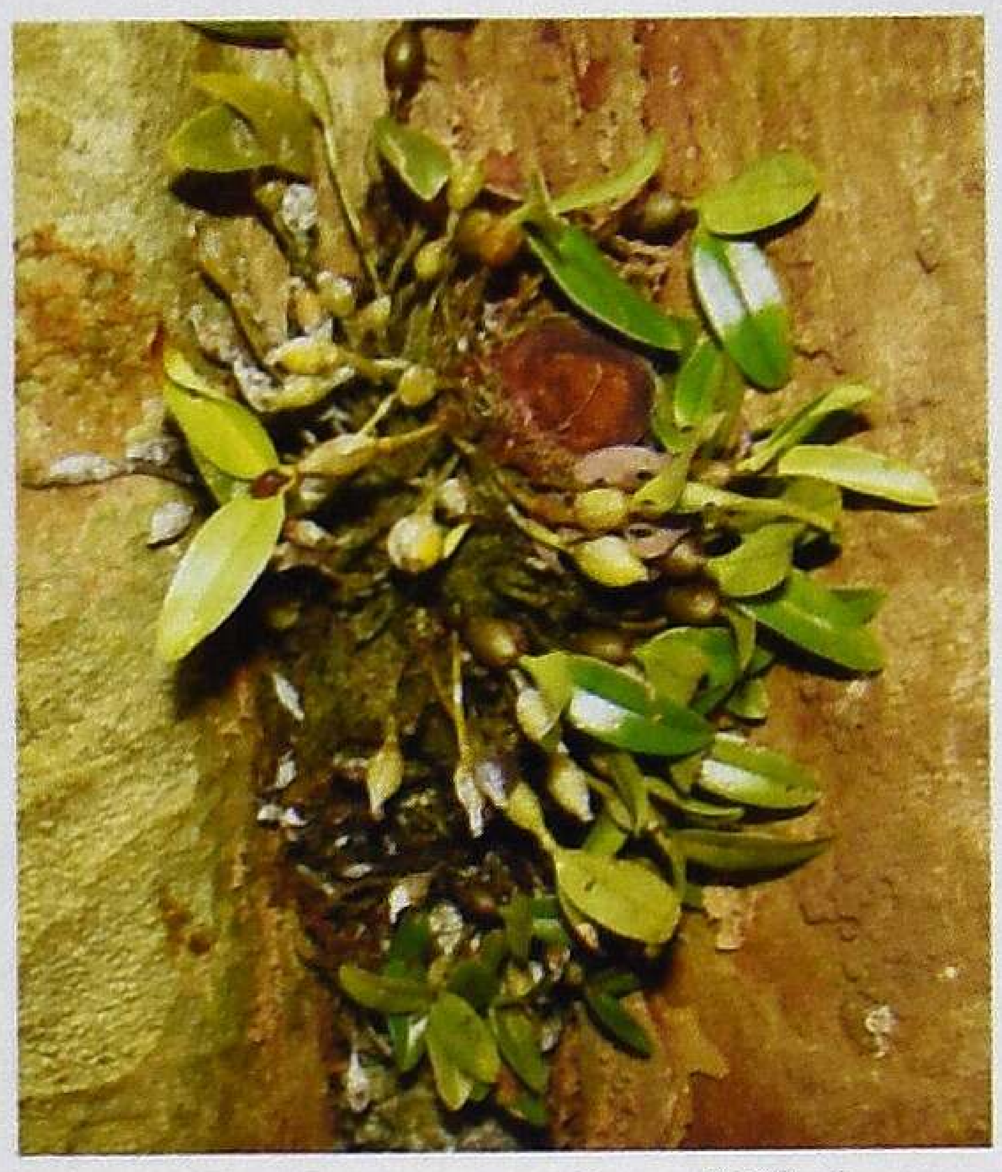
401. *Dendrobium microbulbon* A. Rich.

402. *Dendrobium nanum* Hook.f.

PLATE 47

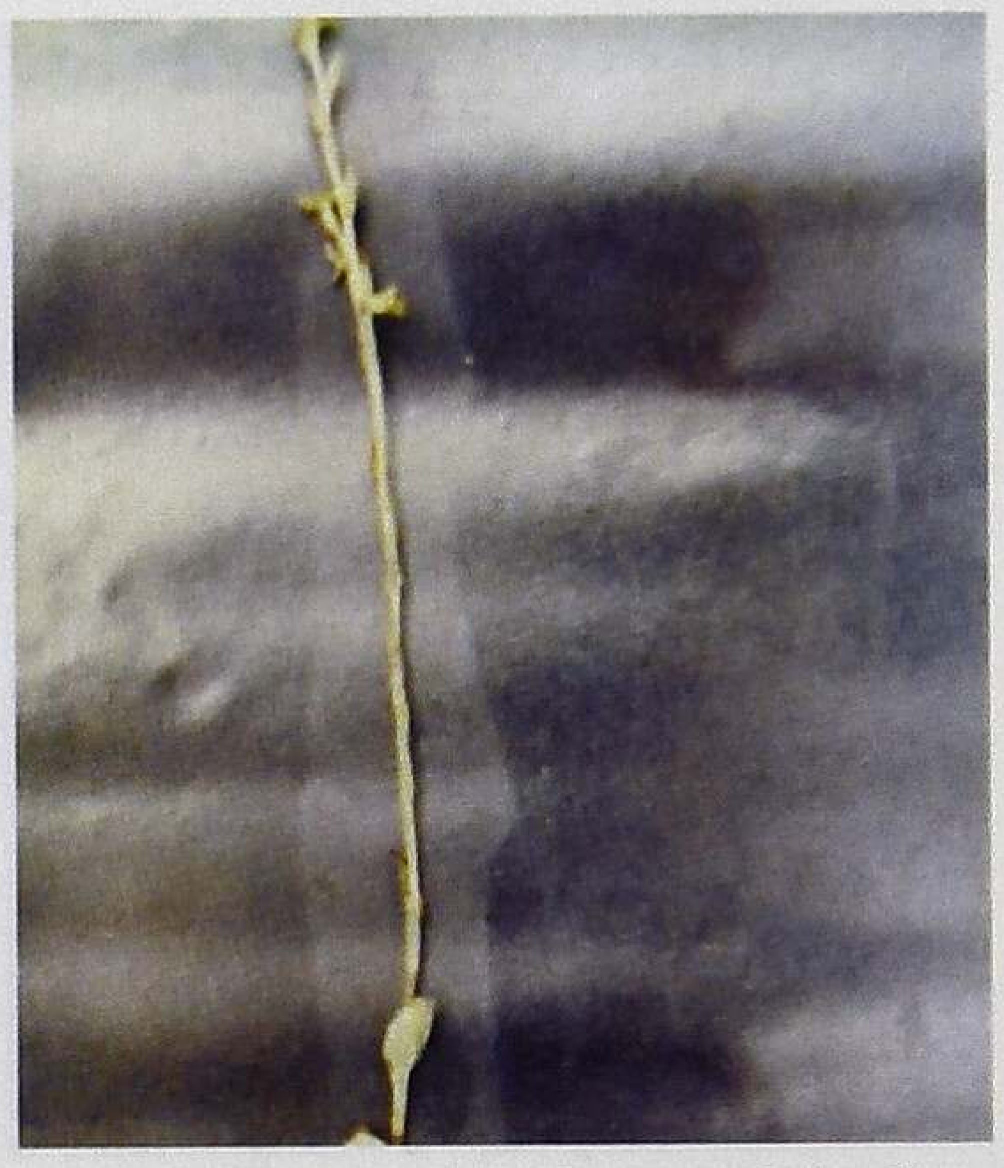
403. *Diplocentrum recurvum* Lindl.

404. *Disperis neilgherrensis* Wight



405. *Eria pauciflora* Wight

406. *Eria polystachya* A. Rich.



407. *Habenaria digitata* Lindl.

408. *Habenaria elliptica* Wight

409. *Habenaria foliosa* A.Rich.

410. *Habenaria heyneana* Lindl.

411. *Habenaria longicorniculata* Graham

PLATE 48

412. *Habenaria longicornu* Lindl.

413. *Liparis viridiflora* (Blume) Lindl.

414. *Luisia birchea* (A. Rich.) Blume

415. *Oberonia brunoniana* Wight

416. *Oberonia verticillata* Wight

417. *Oberonia wightiana* Lindl.

418. *Pecteilis gigantea* (J. E. Smith) Rafin.

419. *Peristylus richardianus* Wight

420. *Robiquetia virescens* (Gard. ex Lindl.) Jayaweera

PLATE 49

421. *Satyrium nepalense* D. Don

422. *Seidenfadeniella filiformis* (Rchb.f.) Christm. & Ormerod.

423. *Seidenfia densiflora* (A. Rich.) Szlach.

424. *Seidenfia rheedei* (Sw.) Szlach.

425. *Seidenfia versicolor* (Lindl.) Marg. & Szlach.

426. *Sirhookera latifolia* (Wight) O. Ktze.

427. *Spiranthes sinensis* (Pers.) Ames

428. *Trichoglottis tenera* (Lindl.) Rchb.f.

429. *Biophytum intermedium* Wight

PLATE 50

430. *Oxalis corniculata* L.

431. *Oxalis dehradunensis* Raiz.

432. *Parnassia wightiana* Wall. ex Wight & Arn.

433. *Decaloba leschenaultii* (DC.) M.Roem.

434. *Passiflora mollissima* (H.B.K.) L. H. Bailey

435. *Passiflora subpeltata* Ortega

436. *Phytolacca octandra* L.

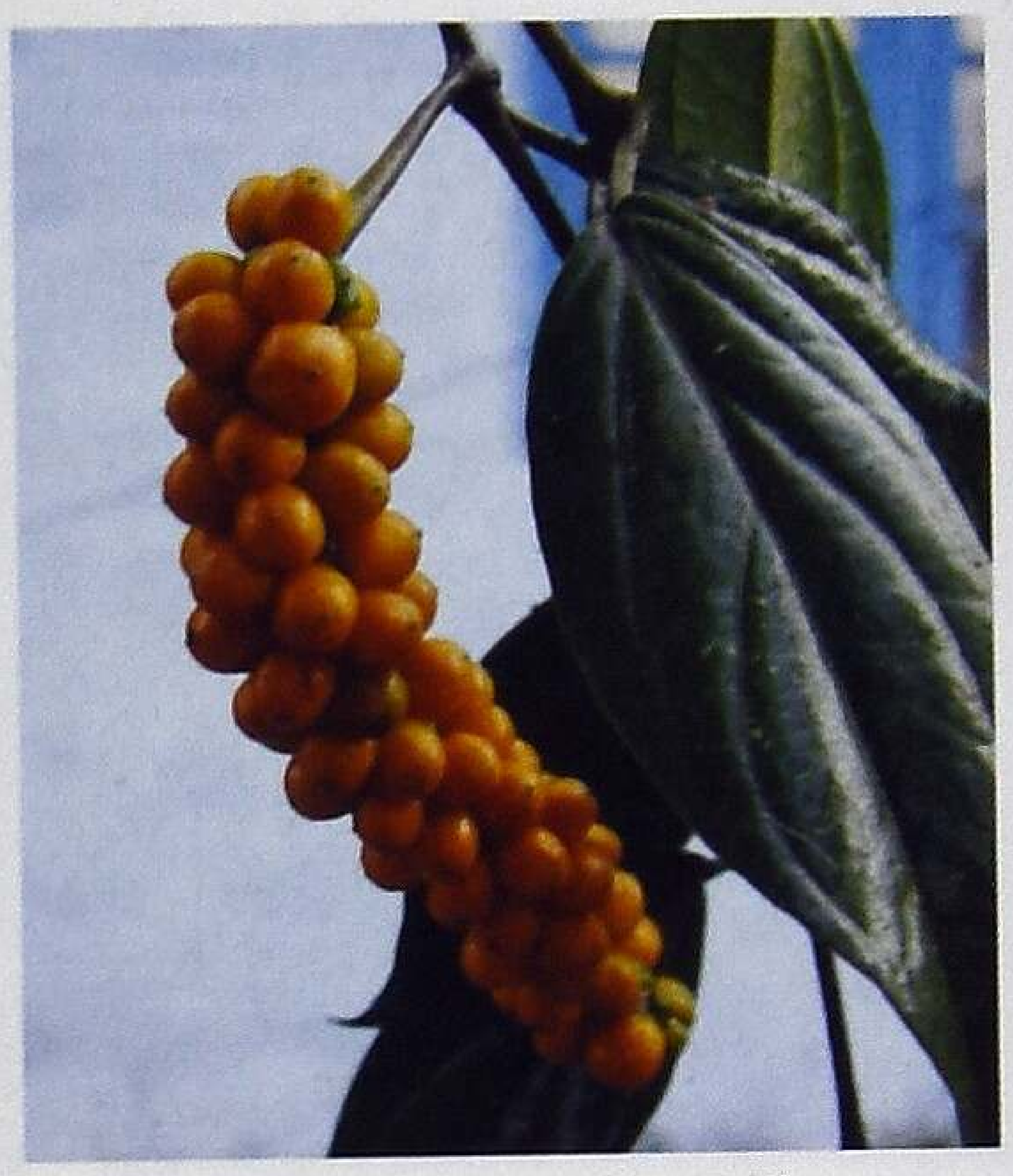
437. *Peperomia blanda* (Jacq.) Kunth

438. *Peperomia tetraphylla* (G.Forst.) Hook. & Arn.

PLATE 51

439. *Piper mullesua* Buch.-Ham. ex D. Don

440. *Piper schmidtii* Hook.f.



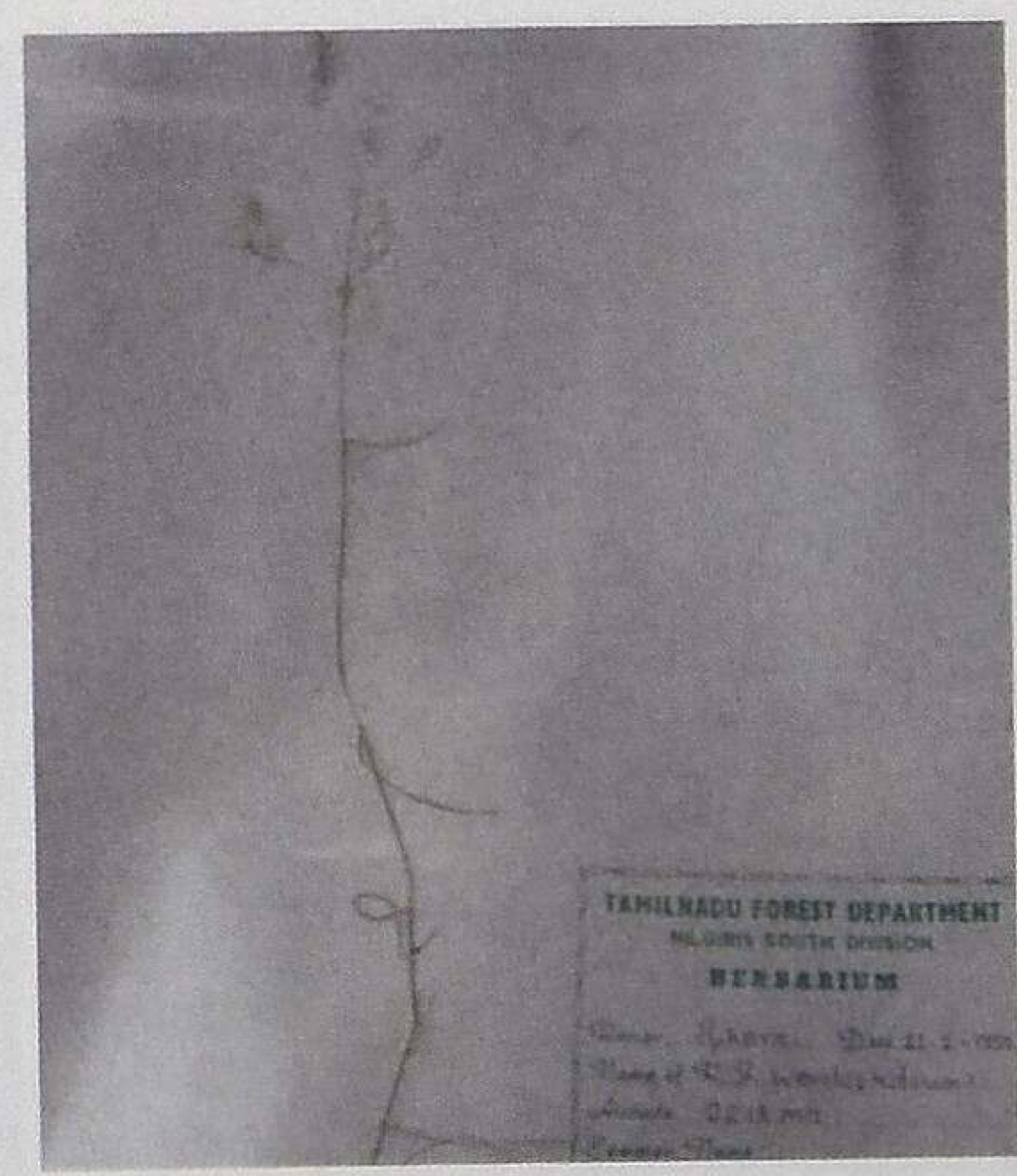
441. *Piper wightii* Miq.

442. *Pittosporum dasycaulon* Miq.

443. *Pittosporum neelgherrense* Wight & Arn.

444. *Pittosporum tetraspermum* Wight & Arn.

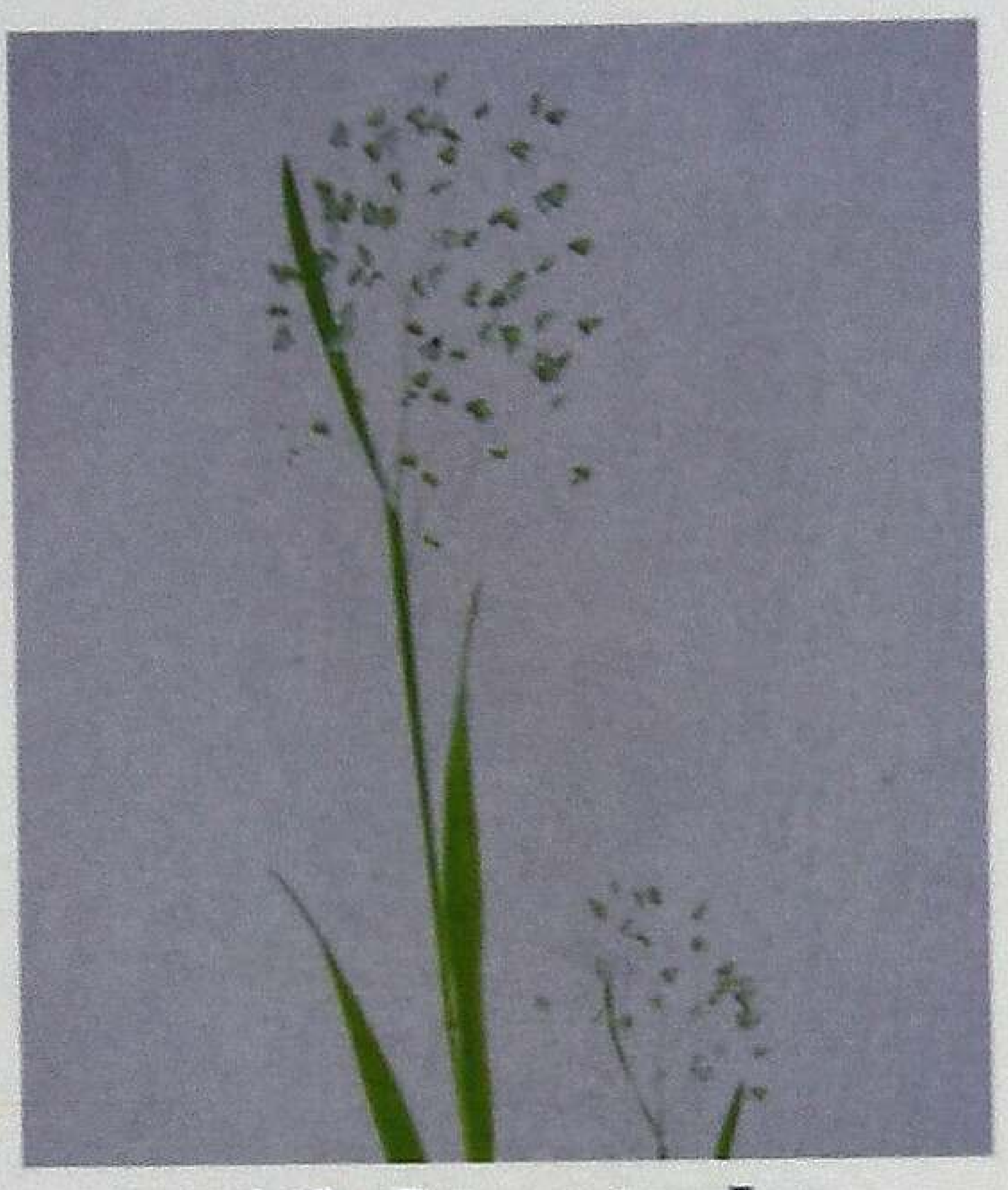
445. *Plantago erosa* Wall.



446. *Agrostis peninsularis* Hook.f.

447. *Briza maxima* L.

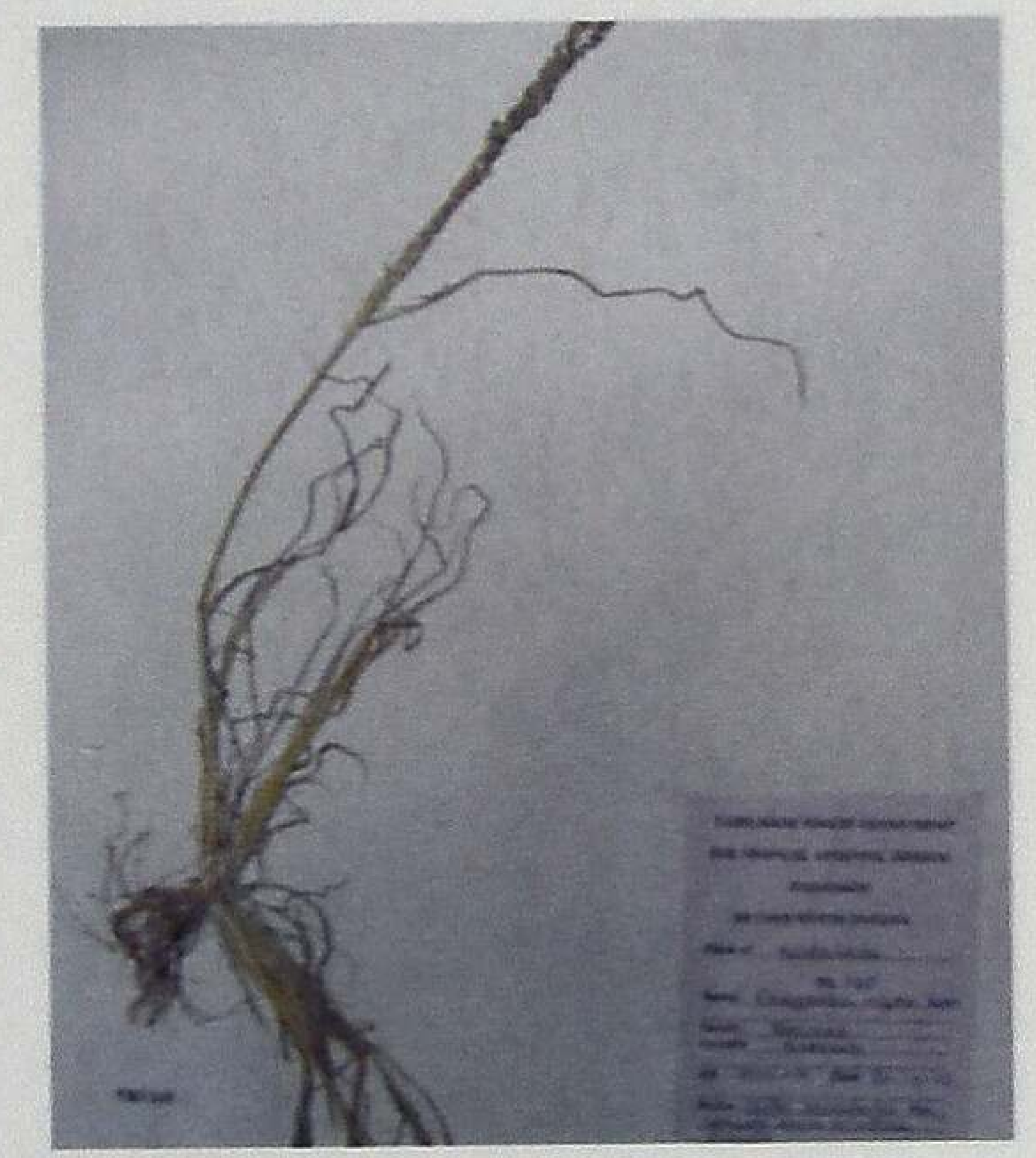
PLATE 52



448. *Briza minor* L.

449. *Chrysopogon nodulibarbis* (Steud.) Henrard

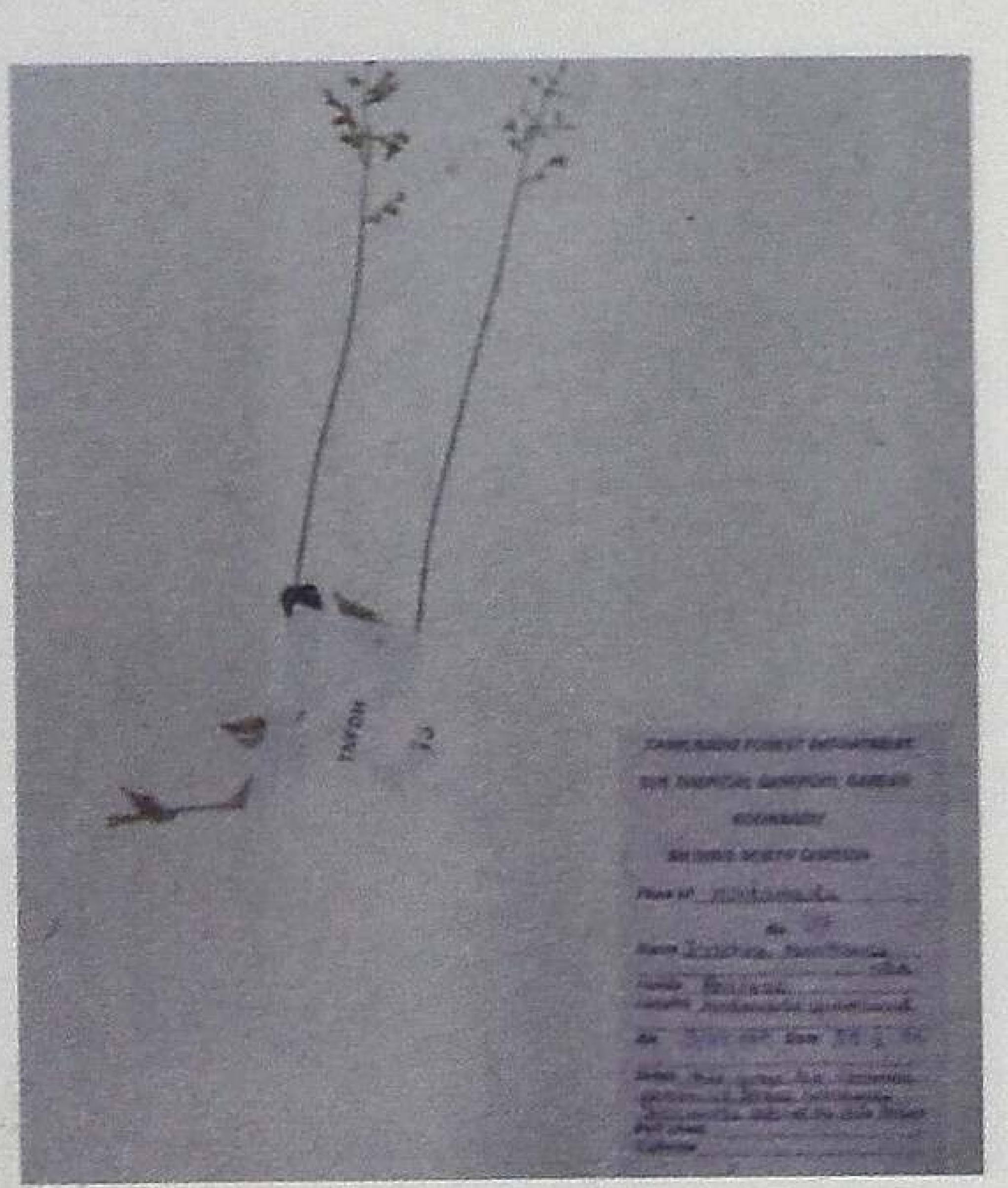
450. *Cymbopogon flexuosus* (Nees ex Steud.) Wats.



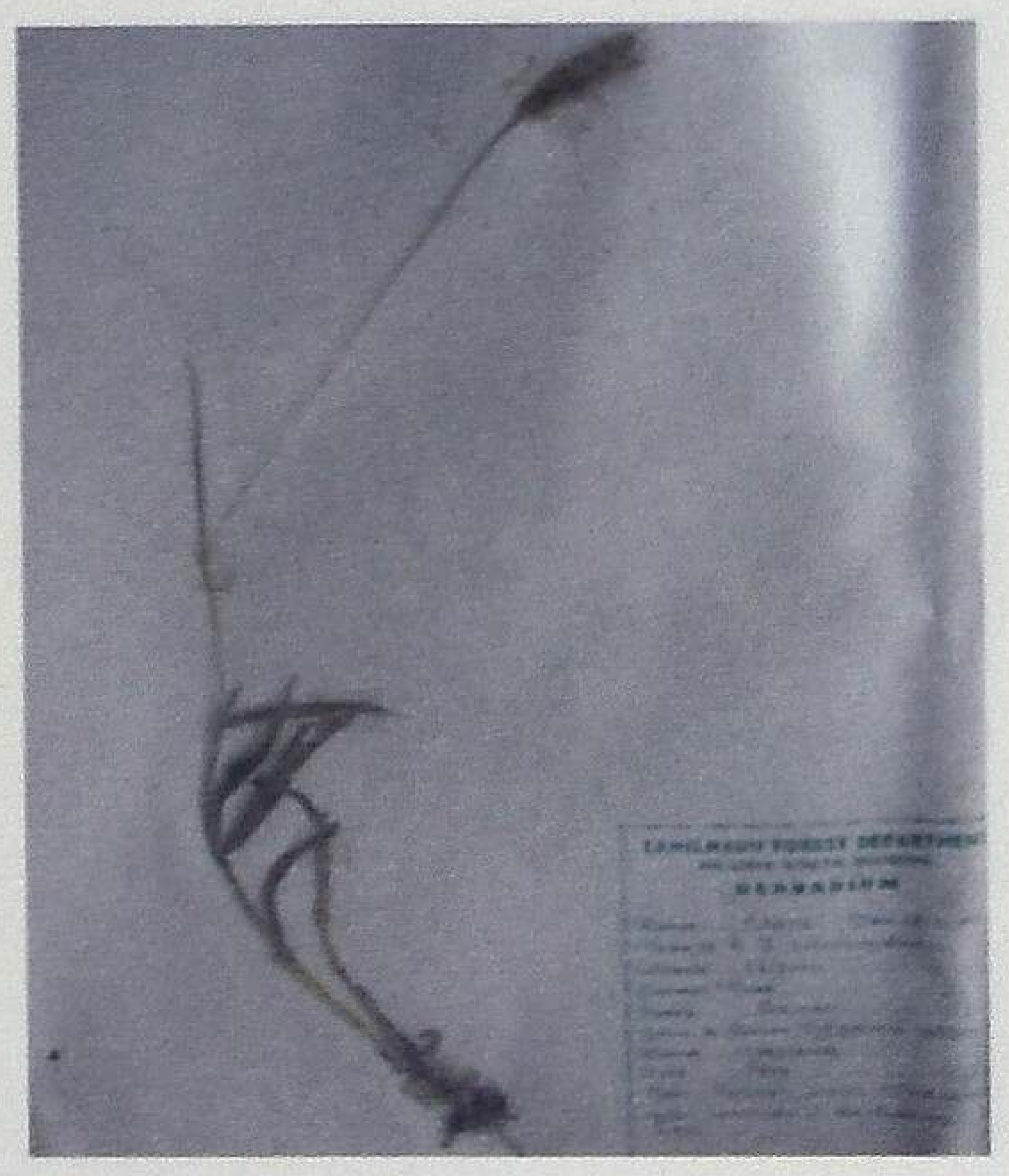
451. *Eragrostis nigra* Nees ex Steud.

452. *Eragrostis unioloides* (Retz.) Nees ex Steud.

453. *Eulalia phaeothrix* (Hack.) O. Ktze.



454. *Isachne kunthiana* (Wight & Arn. ex Steud.) Miq.



455. *Ischaemum indicum* (Hott.) ssp. *indicum* var. *villosum*

456. *Oplismemus undulatifolius* (Ard.) P.Beauv. ex Roem. & Schult.

PLATE 53

457. *Oxytenanthera monadelpha* (Thw.) Alston

458. *Pennisetum clandestinum* Hochst. ex Chiov.

459. *Poa annua* L.

460. *Setaria pumila* (Poir.) Roem. & Schult.

461. *Themeda triandra* Forssk.

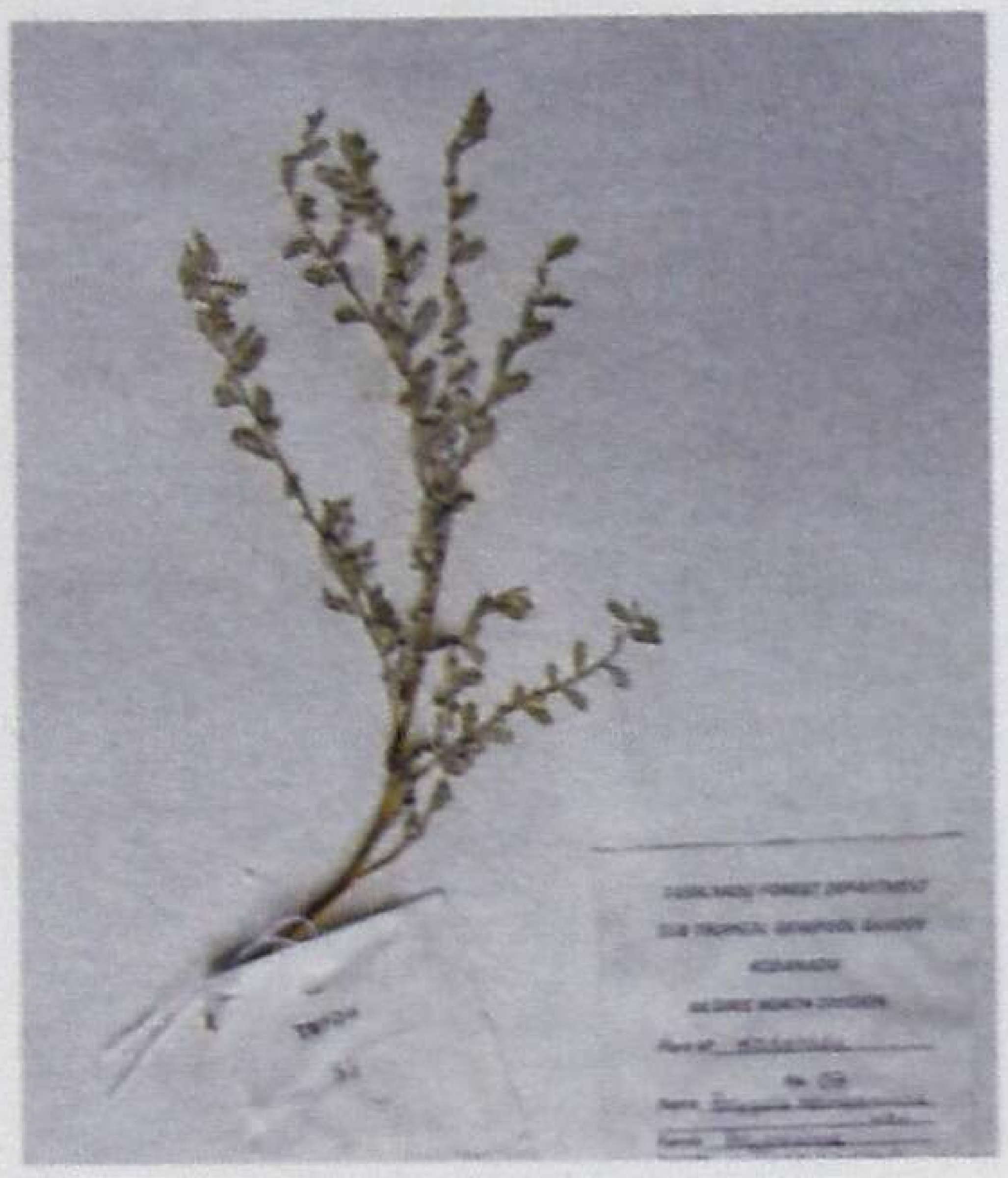
462. *Vulpia myuros* (L.) Gmel.

463. *Polygala arillata* Buch.-Ham. ex D. Don

464. *Polygala bolbothrix* Dunn

465. *Polygala javana* DC.

PLATE 54



466. *Polygala rosmarinifolia* Wight & Arn.

467. *Polygala sibirica* L.

468. *Fagopyrum esculentum* Moench.

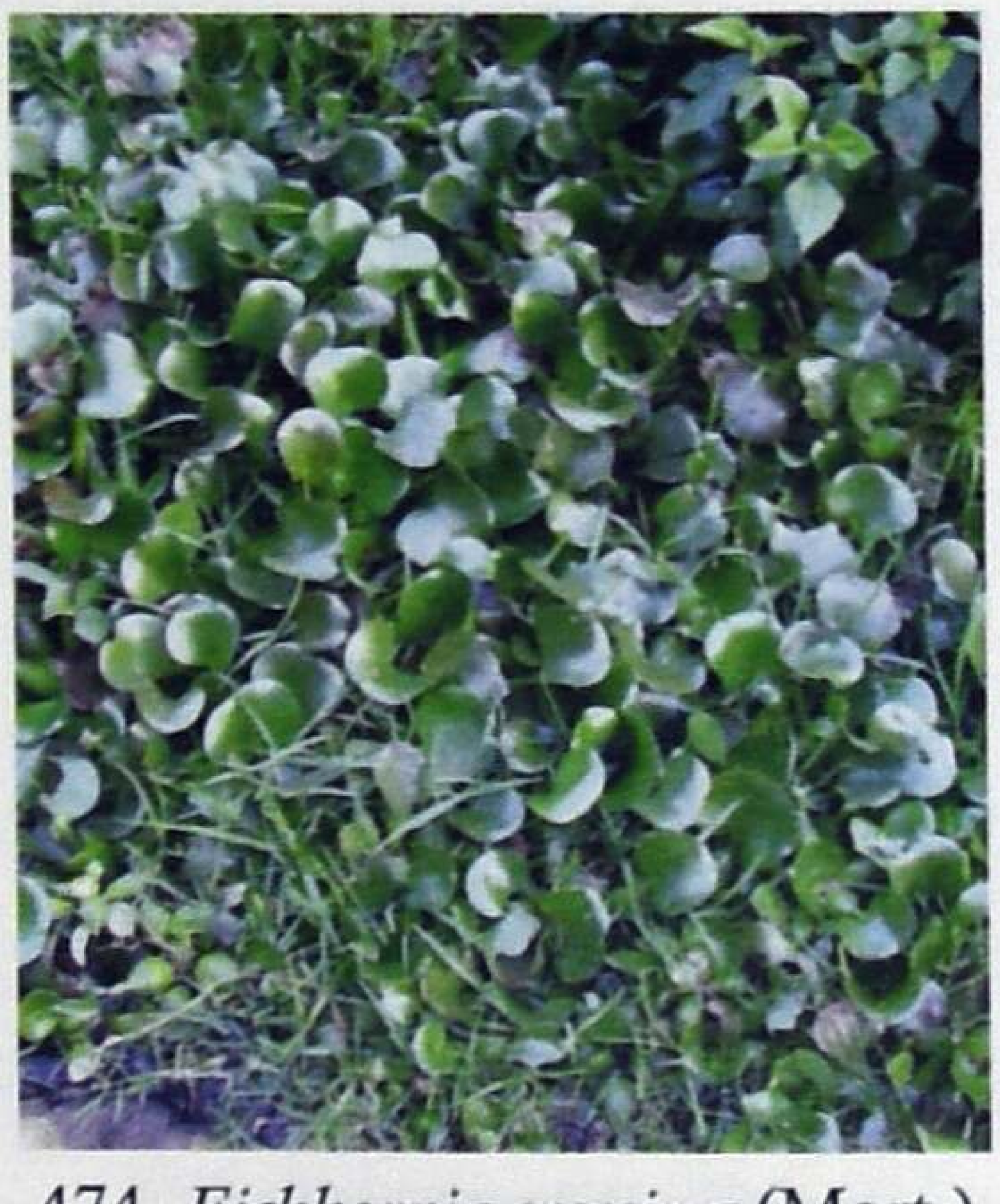
469. *Persicaria chinensis* (L.) Gross.

470. *Persicaria nepalensis* (Meisner) Gross

471. *Persicaria pulchra* (Blume) Sojak

472. *Persicaria strigosa* (R. Br.) Nakai

473. *Rumex nepalense* Spreng.



474. *Eichhornia crassipes* (Mart.) Solms.

PLATE 55

475. *Potamogeton nodosus* Poir.

476. *Lysimachia procumbens* Baudo

477. *Anemone rivularis* Buch.-Ham. ex DC.

478. *Clematis gouriana* Roxb. ex DC.

479. *Clematis munroiana* Wight

480. *Clematis wightiana* Wall. ex Wight & Arn.

481. *Ranunculus diffusus* DC.

482. *Ranunculus reniformis* Wall.ex Wight & Arn.

483. *Ranunculus wallichianus* Wight & Arn.

PLATE 56

484. *Thalictrum javanicum* Blume

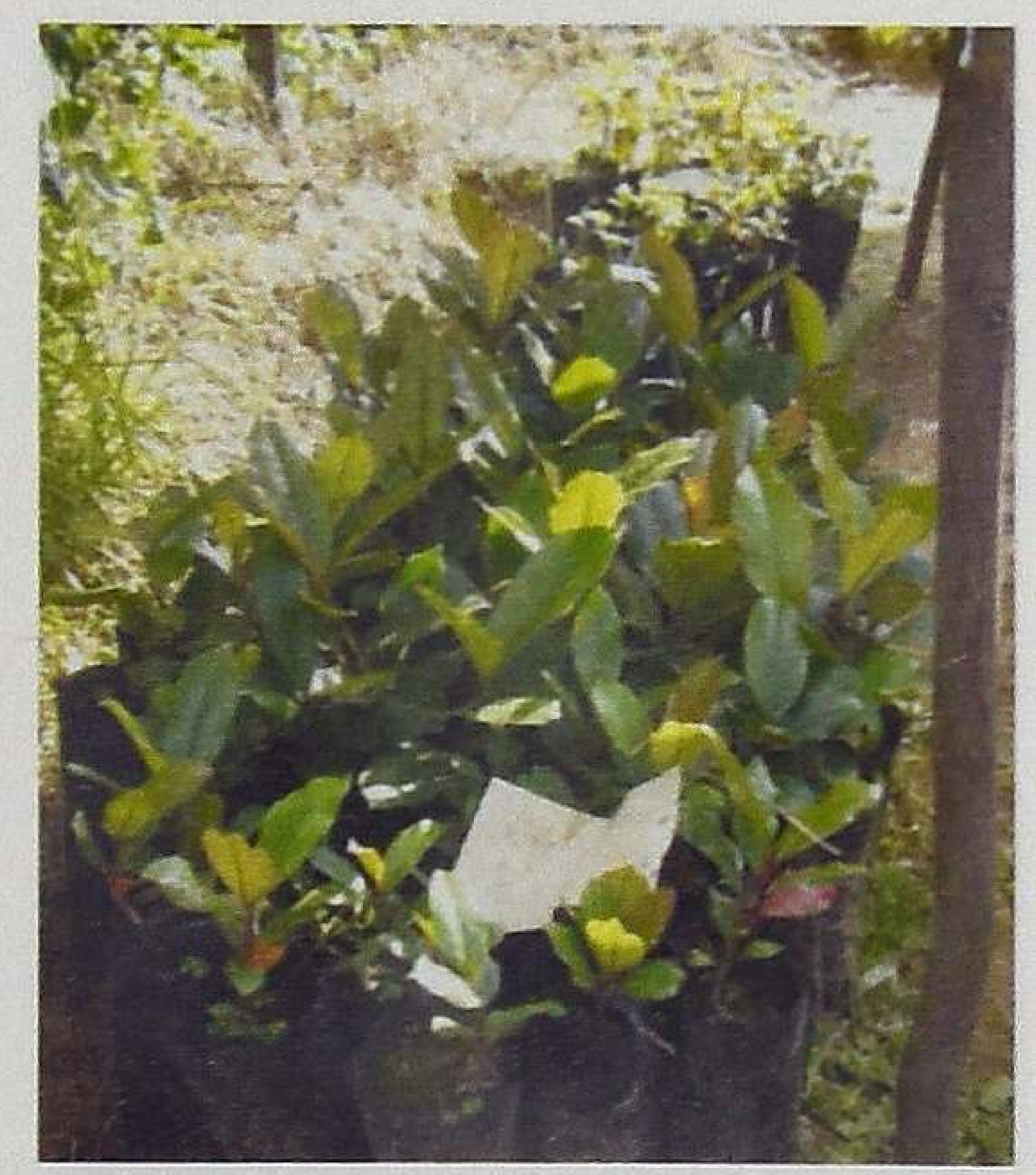
485. *Rhamnus virgatus* Roxb.

486. *Rhamnus wightii* Wight & Arn.

487. *Cotoneaster buxifolius* Wall. ex Wight

488. *Fragaria nilgerrensis* Schltr. ex Gay.

489. *Photinia integrifolia* Lindl. var. *sublanceolata* Miq.



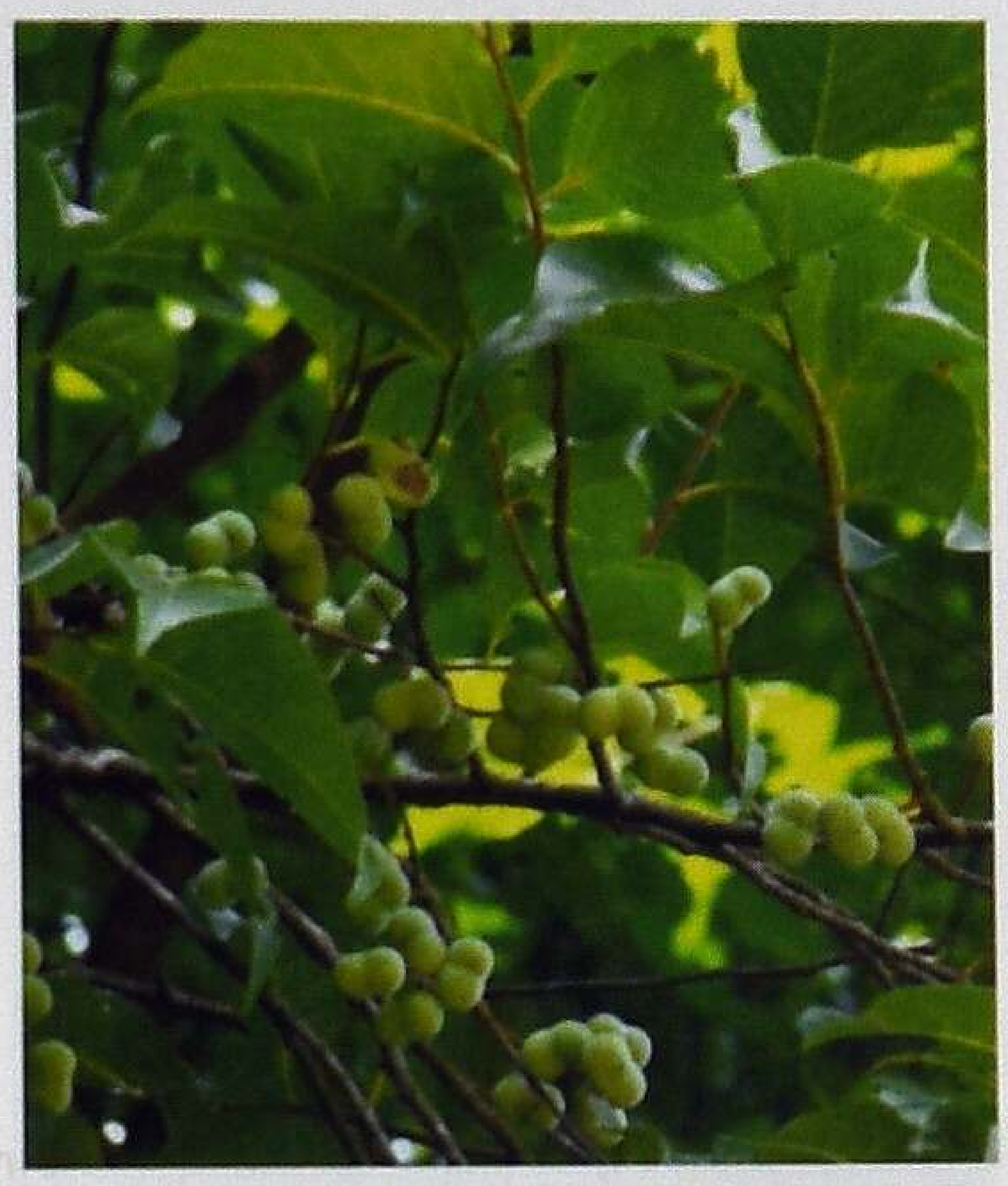
489a. *Photinia integrifolia* Lindl. var. *sublanceolata* Miq.

490. *Photinia serratifolia* (Desf.) Kalkman

491. *Potentilla leschenaultiana* Ser.

PLATE 57

492. *Prinsepia utilis* Royle



493. *Prunus ceylanica* (Wight) Miq.

494. *Rosa leschenaultiana* Red. & Thory ex Wight & Arn.

495. *Rubus ellipticus* Smith

496. *Rubus fairholmianus* Gard.

497. *Rubus glomeratus* Blume

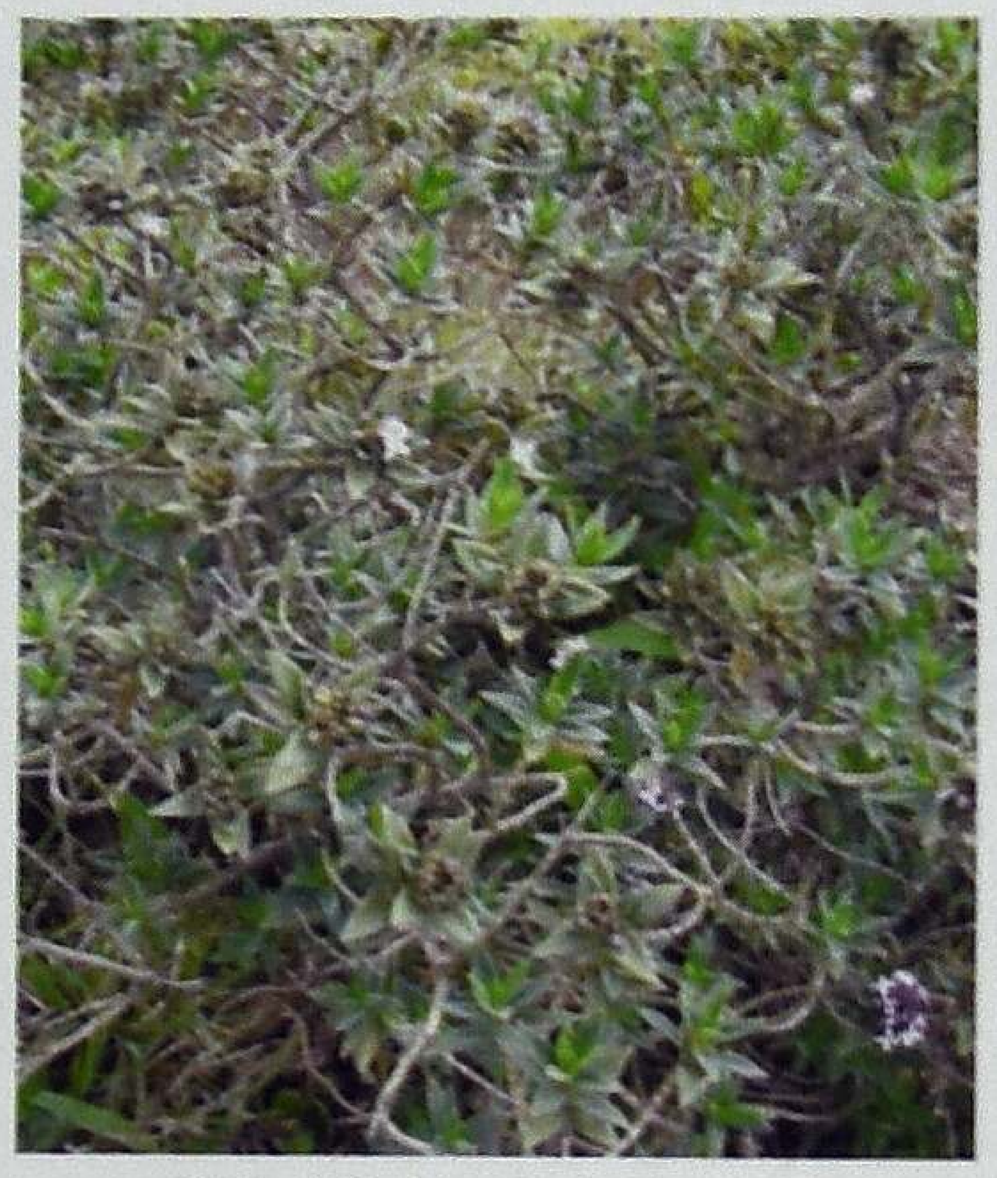
498. *Rubus niveus* Thunb.

499. *Canthium neilgherrense* Wight

500. *Cinchona calisaya* Wedd.

PLATE 58

501. *Gallium asperifolium* Wall.



502. *Hedyotis articularis* R. Br. ex Wight & Arn.

503. *Hedyotis bourdillonii* (Gamble) Rao & Hemadri

504. *Hedyotis hirsutissima* Bedd.

505. *Hedyotis leschenaultiana* DC.

506. *Ixora notoniana* Wall. ex G. Don

507. *Knoxia sumatrensis* (Retz.) DC.

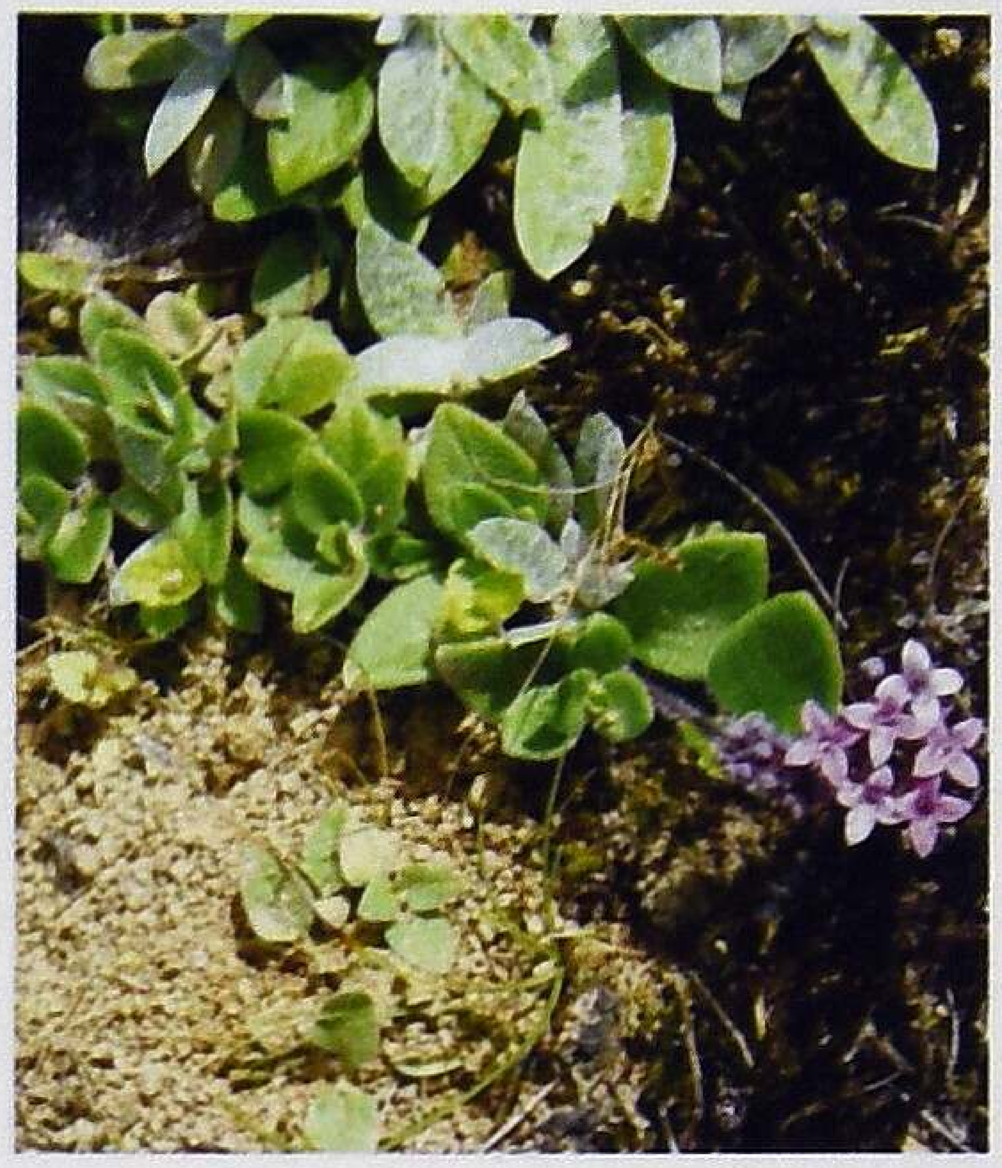
508. *Knoxia wightiana* Wall. ex Wight & Arn.

509. *Lasianthus acuminatus* Wight

PLATE 59

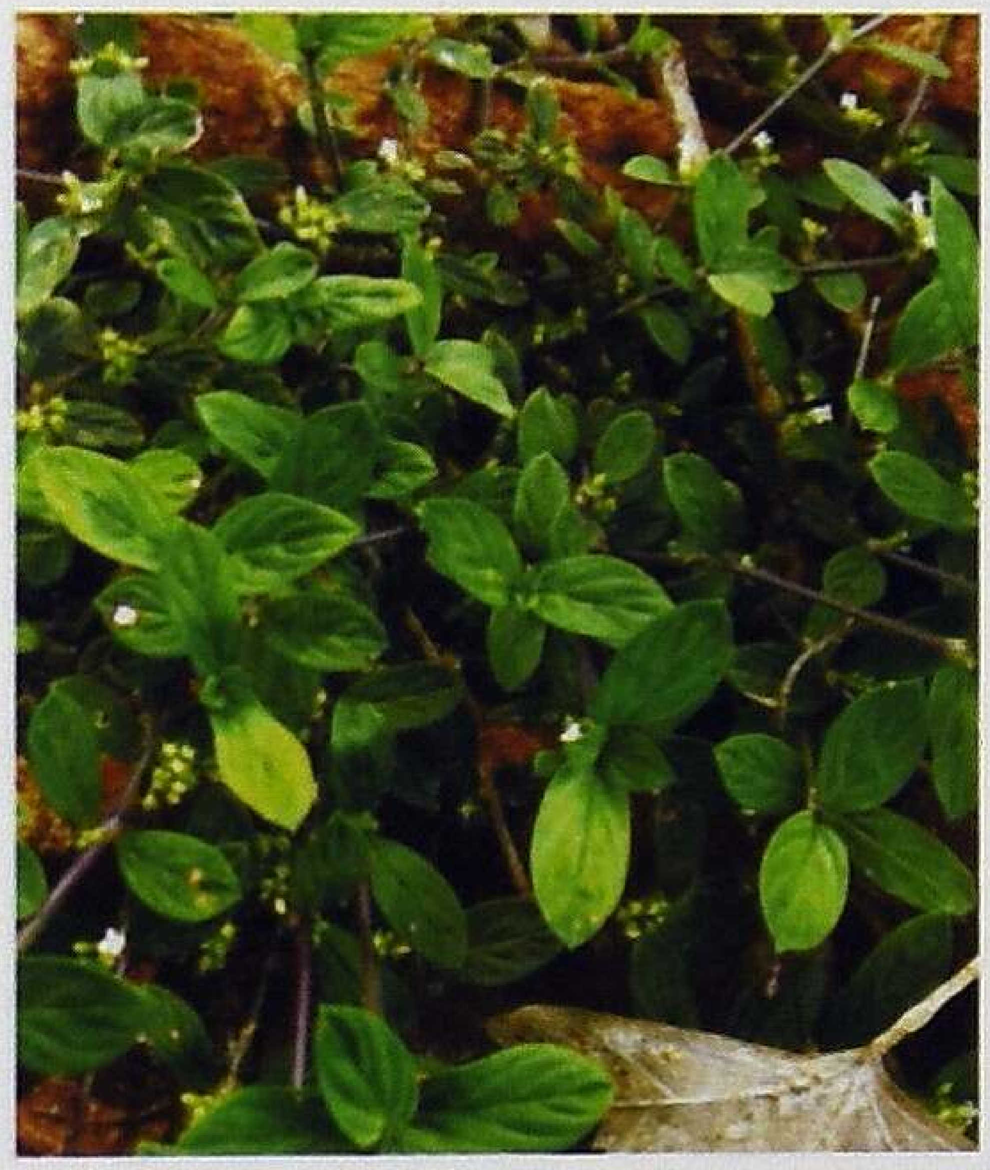
510. *Lasianthus blumeanus* Wight

511. *Lasianthus venulosus* (Wight & Arn.) Wight



512. *Neanotis indica* (DC.) Lewis

513. *Neanotis monosperma* (Wall. ex Wight & Arn.) Lewis



514. *Oldenlandia auricularia* (L.) K. Schum.

515. *Ophiorrhiza brunonis* Wight & Arn.

516. *Pavetta breviflora* DC.

517. *Pleiocraterium verticillare* (Wight & Arn.) Bremek.

518. *Psychotria bisulcata* Wight & Arn.

PLATE 60

519. *Psychotria nilgiriensis* Deb & Gangop.

520. *Psychotria sohmeri* Kiehn

521. *Psychotria truncata* Wall.

522. *Rubia cordifolia* L.

523. *Saprosma foetens* (Wight) K. Schum.

524. *Spermacoce hispida* L.

525. *Spermacoce ocymoides* Burm.f.

526. *Wendlandia thyrsoidea* (Schult.) Steud.

527. *Acronychia pedunculata* (L.) Miq.

PLATE 61

528. *Melicope lunu-ankenda* (Gaertn.) Hartley

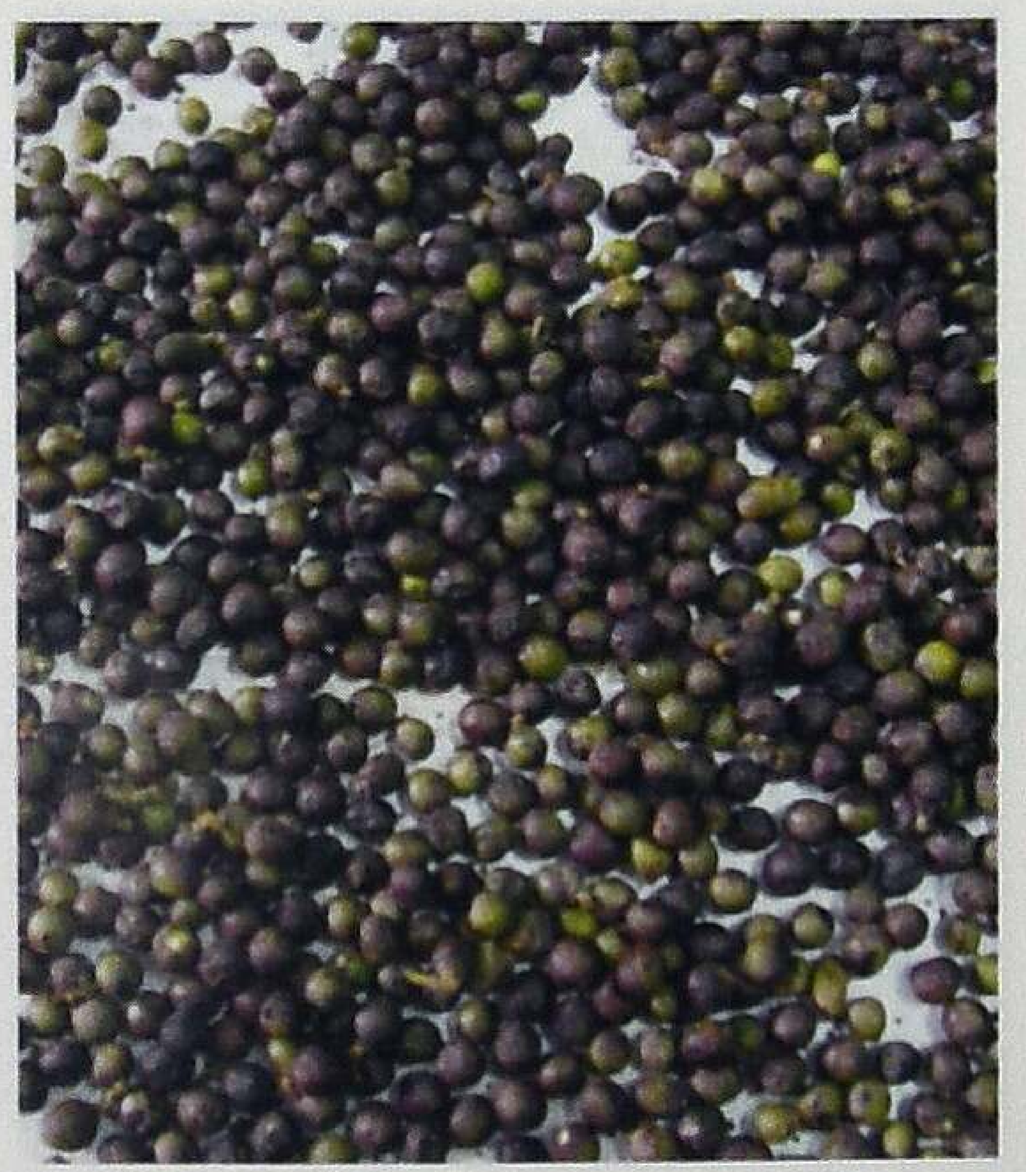
528 a. *Melicope lunu-ankenda* (Gaertn.) Hartley

529. *Toddalia asiatica* (L.) Lam.

530. *Zanthoxylum tetraspermum* Wight & Arn.

531. *Meliosma pinnata* (Roxb.) Maxim. ssp. *barbulata* (Cufod.) Beus.

532. *Meliosma simplicifolia* (Roxb.) Walp. var. *pungens* (Wall. ex Wight & Arn.) Beus.

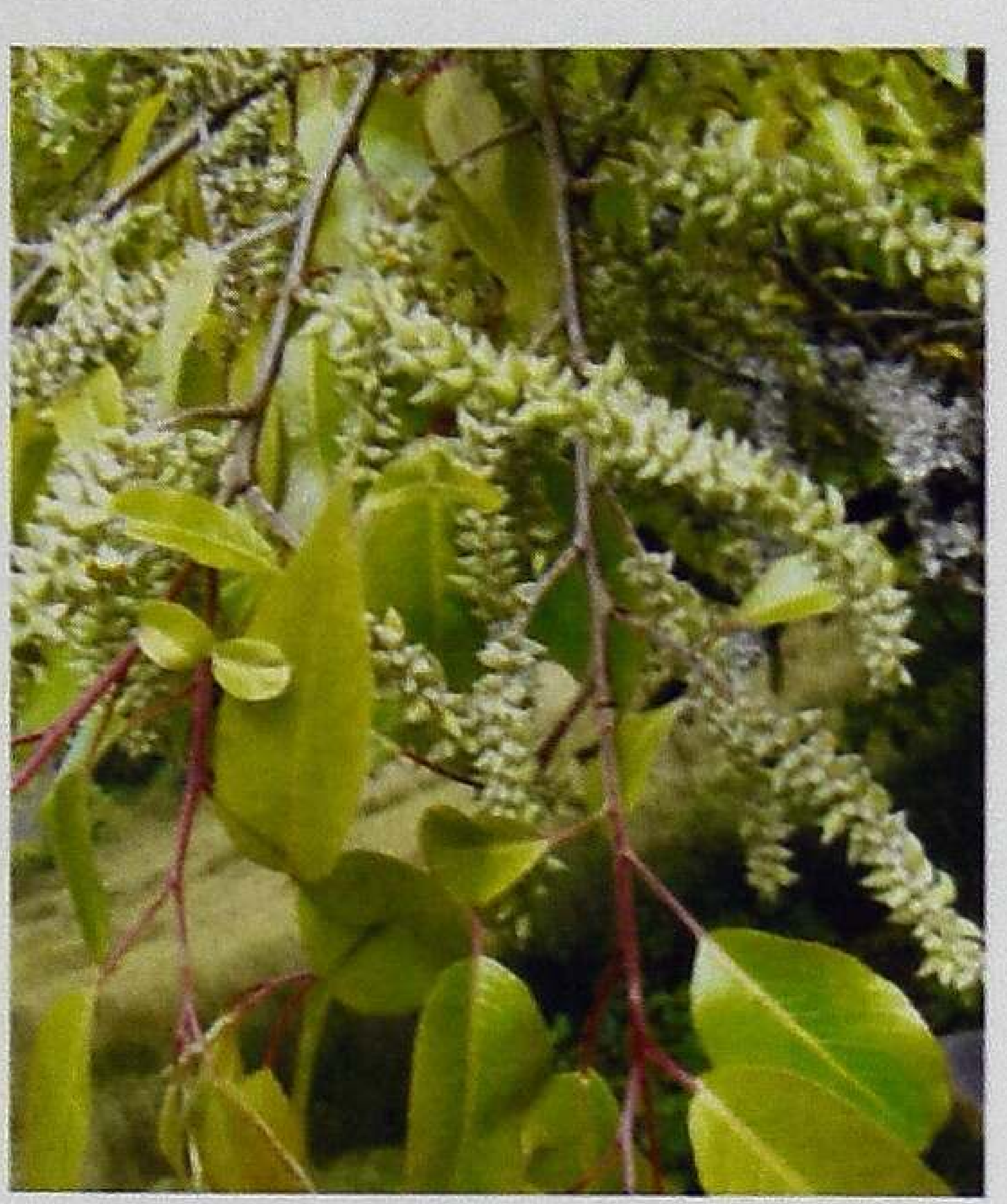


532a. *Meliosma simplicifolia* (Roxb.) Walp. var. *pungens* (Wall. ex Wight & Arn.) Beus.

532b. *Meliosma simplicifolia* (Roxb.) Walp. var. *pungens* (Wall. ex Wight & Arn.) Beus.

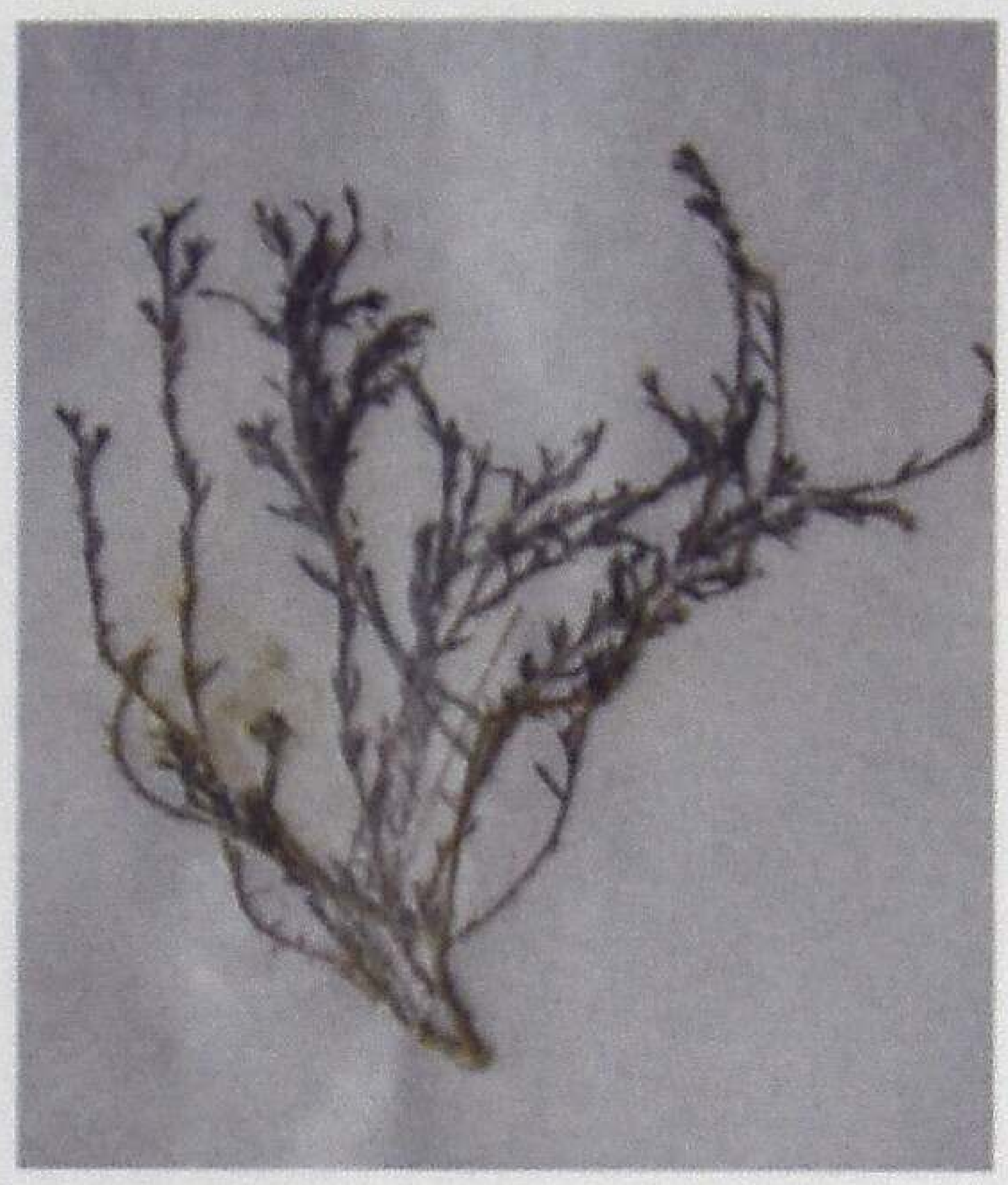
533. *Meliosma simplicifolia* (Roxb.) Walp. ssp. *simplicifolia*

PLATE 62



534. *Salix tetrasperma* Roxb.

535. *Osyris quadripartita* Salzm. ex Decne.



536. *Thesium wightianum* Wall. ex Hook.f.

537. *Allophylus concanicus* Radlk.

538. *Dodonaea viscosa* (L.) Jacq.

539. *Isonandra perrottetiana* A. DC.

540. *Xantolis tomentosa* (Roxb.) Rafin.

541. *Calceolaria mexicana* Benth.

542. *Lindernia hyssopioides* (L.) Haines

PLATE 63

543. *Parasopubia delphiniifolia* (L.) H.-P. Hofm. & Eb. Fisch.

544. *Pedicularis zeylanica* Benth.

545. *Sopubia trifida* Buch.-Ham. ex D. Don

546. *Striga asiatica* (L.) O. Ktze.

547. *Torenia travancorica* Gamble

548. *Verbascum thapsus* L.

549. *Veronica polita* Fries

550. *Smilax aspera* L.

551. *Smilax wightii* A. DC.

PLATE 64

552. *Brugmansia arborea* (L.) Steud.

553. *Brugmansia suaveolens* (Humb. & Bonpl. ex Willd.) Bercht. & Presl

554. *Cestrum aurantiacum* Lindl.

555. *Cestrum elegans* (Brongn. ex Neumann) Schltdl.

556. *Cestrum parqui* L' Herit.

557. *Datura stramonium* L.

558. *Lycianthes laevis* (Dunal) Bitter

559. *Nicandra physalodes* (L.) Gaertn.

560. *Physalis peruviana* L.

PLATE 65

561. *Solanum americanum* Mill.

562. *Solanum denticulatum* Blume

563. *Solanum erianthum* D. Don

564. *Solanum jasminoides* Paxt.

565. *Solanum mauritianum* Scop.

566. *Solanum pseudo-capsicum* L.

567. *Solanum sisymbrifolium* Lam.

568. *Solanum torvum* Sw.

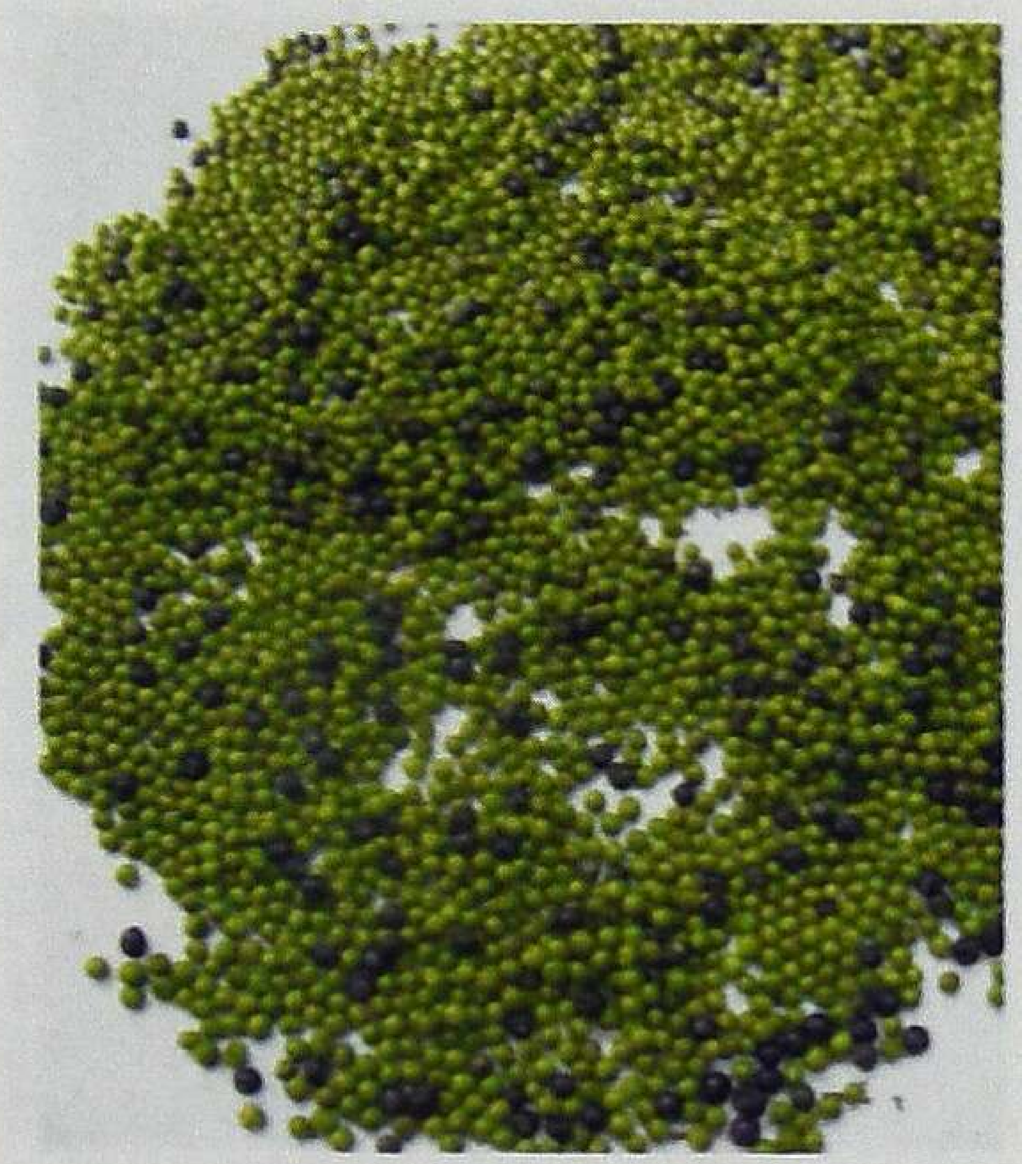
569. *Solanum violaceum Ortega* ssp. *multiflorum* (Clarke) Matthew

PLATE 66

570. *Solanum virginianum* L.

571. *Turpinia cochinchinensis* 3 (Lour.) Merr.

572. *Symplocos cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteb.

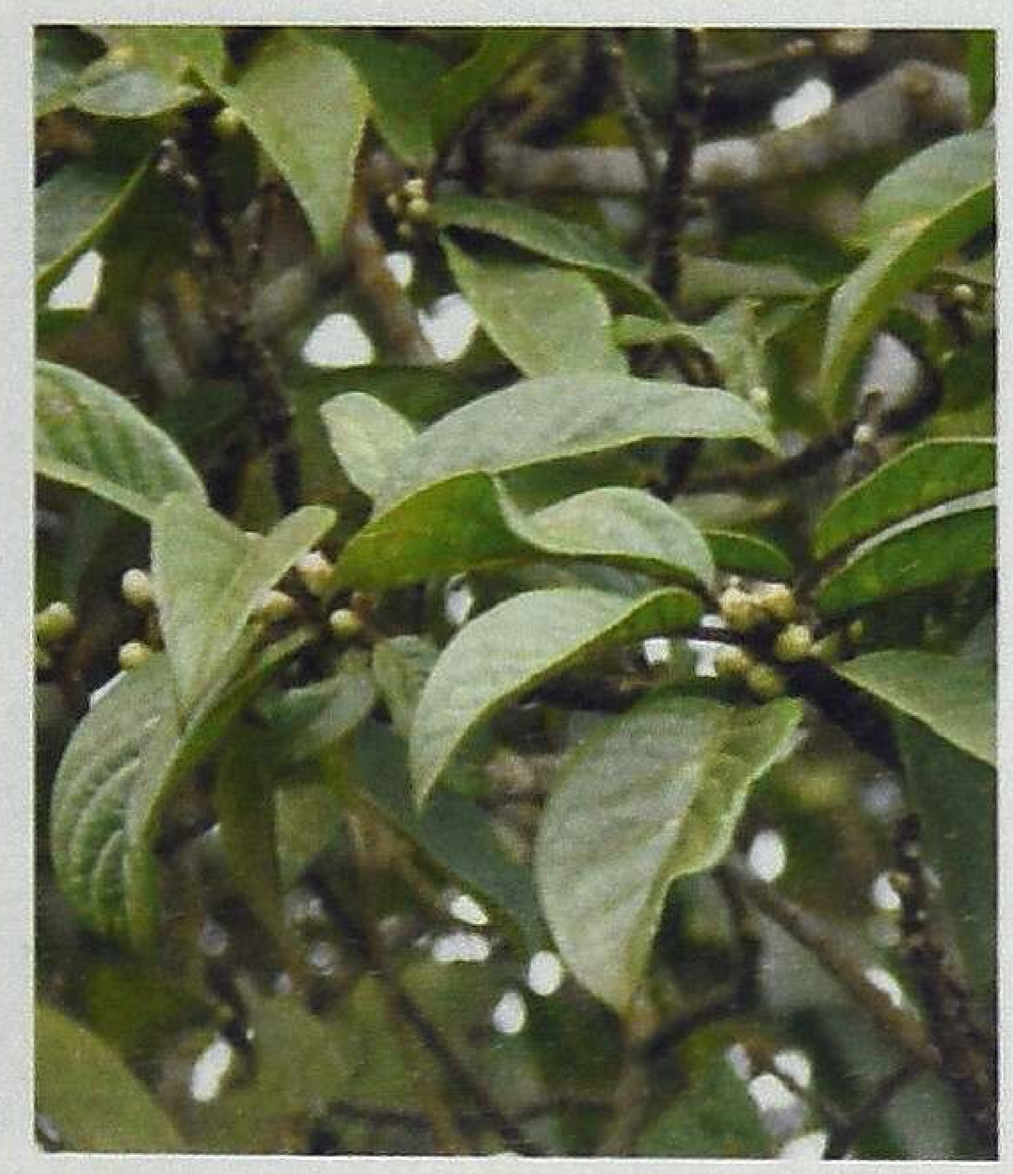


572a. *Symplocos cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteb.

573. *Symplocos foliosa* Wight

573a. *Symplocos foliosa* Wight

574. *Symplocos obtusa* Wall. ex G. Don



575. *Symplocos pendula* Wight

576. *Eurya japonica* Thunb.

PLATE 67

577. *Gordonia obtusa* Wall.ex Wight & Arn.

578. *Ternstroemia gymnanthera* (Wight & Arn.) Bedd.

579. *Gnidia glauca* (Fresen.) Gilg

580. *Celtis philippensis* Blanco var. *wightii* (Planch.) Soep.

581. *Celtis tetrandra* Roxb.

582. *Trema orientalis* (L.) Blume

583. *Droguetia iners* (Forssk.) Schweinf. ssp. *urticoides* (Wight) Friis & Wilmot-Dear

584. *Elatostema lineolatum* Wight

585. *Elatostema sessile* J.R. Forst. & J.G.A. Forst.

PLATE 68

586. *Elatostema surculosum* Wight

587. *Girardinia diversifolia* (Link) Friis

588. *Laportea bulbifera* (Sieb. & Zucc.) Wedd.

589. *Pilea melastomoides* (Poir.) Blume

590. *Pilea wightii* Wedd.

591. *Pouzolzia bennettiana* Wight

592. *Pouzolzia wightii* Bennett

593. *Procris crenata* Robins.

594. *Urtica dioica* L.

PLATE 69

595. *Vaccinium leschenaultii* Wight

595a. *Vaccinium leschenaultii* Wight

596. *Vaccinium neilgherrense* Wight

597. *Valeriana hardwickii* Wall. var. *arnottiana* (Wight) Clarke

598. *Valeriana hookeriana* Wight & Arn.

599. *Rotheca serrata* (L.) Steane & Mabb

600. *Verbena bonariensis* L.

601. *Viola betonicifolia* J.E. Smith

602. *Viola pilosa* Blume

PLATE 70

603. *Korthalsella japonica* (Thunb.) Engl.

604. *Viscum heyneanum* DC.

605. *Cayratia pedata* (Lam.) A. Juss. ex Gagnep. var. *glabra* Gamble

606. *Tetrastigma leucostaphylum* (Dennst.) Alston ex Mabb.

607. *Xyris capensis* Thunb.

608. *Curcuma neilgherrensis* Wight

608a. *Curcuma neilgherrensis* Wight

609. *Globba marantina* L.

610. *Hedychium spicatum* Sm.

Index I - Analysis of 641 Species

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
1	355	*Abelmoschus angulosus* var. *angulosus*	Malvaceae	Shrub									√					√		
2	356	*Abelmoschus angulosus* var. *purpureus*	Malvaceae	Subshrub									√					√	√	
3	375	*Acacia dealbata*	Mimosaceae	Tree					√	√					√					
4	376	*Acacia mearnsii*	Mimosaceae	Tree					√	√					√					
5	207	*Acalypha brachystachya*	Euphorbiaceae	Procum. herb									√					√	√	
6	26	*Achyranthes bidentata*	Amaranthaceae	Scan. herb	AFU						√		√					√	√	
7	62	*Acmella calva*	Asteraceae	Procum. herb	F	√					√		√					√		
8	48	*Acorus calamus*	Araceae	Herb	AFHTUS						√	√		√			√			
9	556	*Acronychia pedunculata*	Rutaceae	Tree	F						√		√						√	
10	316	*Actinodaphne bourdillonii*	Lauraceae	Tree			√						√					√	√	
11	317	*Actinodaphne bourneae*	Lauraceae	Small tree			√						√				√	√	√	
12	318	*Actinodaphne campanulata* var. *campanulata*	Lauraceae	Tree			√						√					√	√	
13	319	*Actinodaphne campanulata* var. *obtusa*	Lauraceae	Tree			√						√					√	√	
14	320	*Actinodaphne lawsonii*	Lauraceae	Tree			√						√					√	√	
15	321	*Actinodaphne salicina*	Lauraceae	Tree			√						√					√	√	
16	63	*Adenostemma lavenia*	Asteraceae	Herb									√					√	√	

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
17	413	*Aerides crispa*	Orchidaceae	Shrub	F		√	√			√		√					√		
18	414	*Aerides ringens*	Orchidaceae	Shrub				√					√					√		
19	267	*Aeschynanthus perrottetii*	Gesneriaceae	Subshrub			√	√					√					√	√	
20	27	*Agapanthus africanus*	Amaryllidaceae	Herb					√					√						
21	64	*Ageratina adenophora*	Asteraceae	Subshrub	F				√		√			√				√		√
22	65	*Ageratum houstonianum*	Asteraceae	Herb	F				√		√			√						√
23	370	*Aglaia bourdillonii*	Meliaceae	Tree			√						√						√	
24	474	*Agrostis peninsularis*	Poaceae	Herb						√			√					√		
25	566	*Allophylus concanicus*	Sapindaceae	Strag. shrub			√						√				√	√	√	
26	136	*Alnus nepalensis*	Betulaceae	Tree	F						√				√					
27	220	*Alysicarpus racemosus*	Fabaceae	Herb			√			√			√					√		
28	66	*Anaphalis aristata*	Asteraceae	Herb			√			√			√					√		
29	67	*Anaphalis beddomei*	Asteraceae	Subshrub			√			√			√					√		
30	68	*Anaphalis bournei*	Asteraceae	Herb			√			√			√							
31	69	*Anaphalis marcescens*	Asteraceae	Herb						√	√		√							
32	70	*Anaphalis meeboldii*	Asteraceae	Herb			√			√			√							
33	71	*Anaphalis neelgerryana*	Asteraceae	Herb			√			√			√							
34	72	*Anaphalis subdecurrens*	Asteraceae	Herb						√			√							
35	73	*Anaphalis travancorica*	Asteraceae	Herb			√			√			√							
36	74	*Anaphalis wightiana*	Asteraceae	Herb			√					√	√					√		
37	1	*Andrographis alata*	Acanthaceae	Subshrub						√			√					√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
38	2	*Andrographis lineata*	Acanthaceae	Herb	F		√			√	√		√					√		
39	3	*Andrographis lobelioides* var. *lobelioides*	Acanthaceae	Spread. herb			√			√			√							
40	506	*Anemone rivularis*	Ranunculaceae	Herb	F					√	√		√					√		
41	287	*Anisochilus dysophylloides*	Lamiaceae	Subshrub			√			√			√							
42	208	*Antidesma montanum*	Euphorbiaceae	Tree	FS						√		√					√	√	
43	371	*Aphanamixis polystachya*	Meliaceae	Tree	AHUS						√		√				√		√	
44	322	*Apollonias arnottii*	Lauraceae	Tree			√						√						√	
45	380	*Ardisia pauciflora*	Myrsinaceae	Shrub									√						√	
46	381	*Ardisia rhomboidea*	Myrsinaceae	Small tree			√						√						√	
47	382	*Ardisia sonchifolia*	Myrsinaceae	Shrub			√						√						√	
48	183	*Argyreia elliptica*	Convolvulaceae	Twiner									√					√	√	
49	184	*Argyreia hirsuta*	Convolvulaceae	Climber	F						√		√					√	√	
50	49	*Arisaema leschenaultii*	Araceae	Herb	F		√			√	√		√					√	√	
51	50	*Arisaema tortuosum*	Araceae	Herb	F					√	√		√					√		
52	75	*Artemisia nilagarica*	Asteraceae	Shrub	AF		√			√	√			√	√					
53	475	*Arundinella vaginata*	Poaceae	Herb			√			√			√							
54	337	*Asparagus fysonii*	Liliaceae	Climber			√						√					√		
55	4	*Asystasia crispata*	Acanthaceae	Under shrub			√						√					√	√	
56	5	*Barleria involucrata* var. *elata*	Acanthaceae	Subshrub			√						√					√	√	
57	323	*Beilschmiedia wightii*	Lauraceae	Large tree			√						√					√	√	

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
58	134	*Berberis tinctoria*	Berberidaceae	Shrub	F						√		√					√		
59	76	*Bidens pilosa* var. *minor*	Asteraceae	Herb	F						√		√							√
60	456	*Biophytum intermedium*	Oxalidaceae	Herb									√					√		
61	77	*Blumea axillaris*	Asteraceae	Herb	F	√				√	√		√							√
62	209	*Breynia retusa*	Euphorbiaceae	Shrub	AFU	√				√	√		√					√	√	
63	210	*Briedelia retusa*	Euphorbiaceae	Tree	AFS	√				√	√		√						√	
64	476	*Briza maxima*	Poaceae	Herb					√	√				√						
65	477	*Briza minor*	Poaceae	Herb					√	√				√						
66	581	*Brugmansia arborea*	Solanaceae	Shrub	H				√		√			√						
67	582	*Brugmansia suaveolens*	Solanaceae	Shrub	H				√		√			√						
68	415	*Bulbophyllum elegantulum*	Orchidaceae	Herb			√	√					√				√	√		
69	416	*Bulbophyllum fischeri*	Orchidaceae	Herb				√					√					√	√	
70	28	*Bunium nothum*	Apiaceae	Decum. herb						√			√				√			
71	29	*Bupleurum distichophyllum*	Apiaceae	Herb			√			√			√							
72	30	*Bupleurum mucronatum*	Apiaceae	Herb						√			√							
73	31	*Bupleurum plantaginifolium*	Apiaceae	Herb			√			√			√							
74	142	*Burmannia candelabrum*	Burmanniaceae	Herb								√	√							
75	143	*Buxus papillosa*	Buxaceae	Shrub	HF				√		√				√					
76	145	*Caesalpinia decapetala*	Caesalpiniaceae	Strag. shrub	F						√			√						
77	221	*Cajanus rugosus*	Fabaceae	Climber									√					√	√	

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
78	222	*Cajanus trinervius*	Fabaceae	Shrub									√					√	√	
79	417	*Calanthe sylvatica*	Orchidaceae	Herb									√					√	√	
80	570	*Calceolaria mexicana*	Scrophulariaceae	Herb					√			√		√				√		√
81	528	*Canthium neilgherrense*	Rubiaceae	Shrub			√						√					√	√	
82	138	*Capsella bursa-pastoris*	Brassicaceae	Herb	HF						√		√							√
83	139	*Cardamine africana*	Brassicaceae	Herb					√									√		√
84	140	*Cardamine hirsuta*	Brassicaceae	Herb									√					√		√
85	188	*Carex nubigena*	Cyperaceae	Herb								√	√							
86	189	*Carex phacota*	Cyperaceae	Herb								√	√							
87	162	*Cassine paniculata*	Celastraceae	Large tree									√					√	√	
88	636	*Cayratia pedata* var. *glabra*	Vitaceae	Climber	F		√				√		√				√	√	√	
89	163	*Celastrus paniculatus*	Celastraceae	Climber	AFTUS	√				√	√		√				√	√	√	
90	609	*Celtis philippensis* var. *wightii*	Ulmaceae	Large tree	FS						√		√					√	√	
91	610	*Celtis tetrandra*	Ulmaceae	Tree									√					√		
92	32	*Centella asiatica*	Apiaceae	Prost. herb	AFHTU	√				√	√		√							
93	155	*Cerastium glomeratum*	Caryophyllaceae	Herb	F						√		√					√		√
94	156	*Cerastium indicum*	Caryophyllaceae	Decum. herb	F						√		√					√		√
95	583	*Cestrum aurantiacum*	Solanaceae	Shrub					√					√				√		
96	584	*Cestrum elegans*	Solanaceae	Shrub					√					√				√		

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
97	585	*Cestrum parqui*	Solanaceae	Shrub	F				√		√			√				√		
98	146	*Chamaecrista nictitans* ssp. *patellaria* var. *glabrata*	Caesalpiniaceae	Herb						√			√							
99	418	*Cheirostylis flabellata*	Orchidaceae	Herb						√			√					√		
100	172	*Chenopodium album*	Chenopodiaceae	Herb	AFUS						√		√	√						
101	400	*Chionanthus ramiflorus*	Oleaceae	Large tree									√						√	
102	338	*Chlorophytum malabaricum*	Liliaceae	Herb			√			√			√	√						
103	478	*Chrysopogon nodulibarbis*	Poaceae	Herb						√			√							
104	529	*Cinchona calisaya*	Rubiaceae	Tree	FM				√		√				√					
105	324	*Cinnamomum sulphuratum*	Lauraceae	Tree	F		√			√	√		√				√	√	√	
106	325	*Cinnamomum wightii*	Lauraceae	Tree	AS		√			√	√		√				√	√		
107	410	*Circaea alpinia* ssp. *imaicola*	Onagraceae	Herb	F						√		√							√
108	78	*Cirsium wallichii* var. *wightii*	Asteraceae	Subshrub	F					√	√		√							
109	79	*Cissampelopsis corymbosa*	Asteraceae	Climber									√					√	√	
110	419	*Cleisostoma tenuifolium*	Orchidaceae	Shrub	F			√			√		√					√		
111	507	*Clematis gouriana*	Ranunculaceae	Climber	AF						√		√					√	√	
112	508	*Clematis munroiana*	Ranunculaceae	Climber			√						√					√		
113	509	*Clematis wightiana*	Ranunculaceae	Climber	F		√				√		√					√		
114	288	*Clinopodium umbrosum*	Lamiaceae	Herb	F						√		√					√		√
115	420	*Coelogyne mossiae*	Orchidaceae	Herb			√	√		√			√				√	√		
116	421	*Coelogyne nervosa*	Orchidaceae	Herb			√	√		√			√				√	√		
117	422	*Coelogyne odoratissima*	Orchidaceae	Herb				√		√			√					√		

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
118	51	*Colocasia esculenta*	Araceae	Herb	AFUS	√					√	√	√							
119	176	*Commelina wightii*	Commelinaceae	Procum. herb			√			√			√				√	√		
120	423	*Conchidium braccatum*	Orchidaceae	Herb				√					√					√	√	
121	424	*Conchidium nanum*	Orchidaceae	Herb			√	√					√					√	√	
122	80	*Conyza bonariensis*	Asteraceae	Herb	F				√		√			√						√
123	81	*Conyza japonica*	Asteraceae	Herb									√							
124	82	*Conyza stricta*	Asteraceae	Herb	F						√		√							
125	141	*Coronopus didymus*	Brassicaceae	Procum. herb	F						√			√						√
126	516	*Cotoneaster buxifolius*	Rosaceae	Shrub	F		√				√		√				√	√		
127	83	*Cotula australis*	Asteraceae	Prost. herb					√				√							√
128	84	*Crassocephalum crepidioides*	Asteraceae	Herb	F						√		√							√
129	223	*Crotalaria albida*	Fabaceae	Herb	F					√	√		√					√	√	
130	224	*Crotalaria barbata*	Fabaceae	Shrub			√						√					√	√	
131	225	*Crotalaria calycina*	Fabaceae	Shrub						√			√					√	√	
132	226	*Crotalaria formosa*	Fabaceae	Shrub			√			√			√					√	√	
133	227	*Crotalaria fysonii* var. *fysonii*	Fabaceae	Herb			√			√			√					√	√	
134	228	*Crotalaria madurensis*	Fabaceae	Shrub			√			√			√					√	√	
135	229	*Crotalaria notonii*	Fabaceae	Shrub			√			√			√					√	√	

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
136	230	*Crotalaria obtecta* var. *obtecta*	Fabaceae	Under shrub			√			√			√					√	√	
137	231	*Crotalaria scabrella*	Fabaceae	Herb						√			√					√	√	
138	232	*Crotalaria semperflorens*	Fabaceae	Shrub						√			√					√	√	
139	233	*Crotalaria spectabilis*	Fabaceae	Under shrub	F					√	√		√					√	√	
140	234	*Crotalaria walkeri*	Fabaceae	Scan. shrub						√			√					√	√	
141	211	*Croton laccifer*	Euphorbiaceae	Shrub									√					√		
142	326	*Cryptocarya lawsonii*	Lauraceae	Tree			√						√					√		
143	327	*Cryptocarya neilgherrensis*	Lauraceae	Large tree			√						√					√	√	
144	280	*Curculigo orchioides*	Hypoxidaceae	Herb	AFTUS					√	√		√							
145	639	*Curcuma neilgherrensis*	Zingiberaceae	Herb			√			√			√							
146	177	*Cyanotis arachnoidea*	Commelinaceae	Herb						√			√							
147	178	*Cyanotis obtusa*	Commelinaceae	Procum. herb						√			√							
148	179	*Cyanotis villosa*	Commelinaceae	Procum. herb						√			√							
149	479	*Cymbopogon flexuosus*	Poaceae	Herb	F					√	√		√							
150	137	*Cynoglossum zeylanicum*	Boraginaceae	Herb	FS					√	√		√							
151	235	*Cytisus scoparius*	Fabaceae	Shrub	F				√		√			√						
152	85	*Dahlia imperialis*	Asteraceae	Shrub					√					√				√		

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153	194	*Daphniphyllum neilgherrense*	Daphniphyllaceae	Tree									√					√	√	
154	586	*Datura stramonium*	Solanaceae	Subshrub	AFHUS				√		√			√						√
155	58	*Decalepis nervosa*	Asclepiadaceae	Twiner			√						√				√	√		
156	461	*Decaloba leschenaultii*	Passifloraceae	Climber			√		√				√					√	√	
157	425	*Dendrobium microbulbon*	Orchidaceae	Herb			√	√					√					√		
158	426	*Dendrobium nanum*	Orchidaceae	Herb			√	√					√					√		
159	345	*Dendrophthoe memecylifolia*	Loranthaceae	Shrub			√						√		√	√		√		
160	346	*Dendrophthoe neelgherrensis*	Loranthaceae	Shrub									√		√	√		√	√	
161	347	*Dendrophthoe trigona*	Loranthaceae	Shrub			√						√			√		√	√	
162	236	*Derris benthamii*	Fabaceae	Woody climber									√					√		
163	237	*Derris canarensis*	Fabaceae	Woody climber			√						√					√		
164	238	*Desmodium alysicarpoides*	Fabaceae	Herb									√					√		
165	239	*Desmodium ferrugineum* var. *ferrugineum*	Fabaceae	Shrub									√					√		
166	240	*Desmodium microphyllum*	Fabaceae	Trail. herb	F						√		√					√		
167	241	*Desmodium repandum*	Fabaceae	Under shrub									√					√		
168	86	*Dichrocephala chrysanthemifolia*	Asteraceae	Herb	F						√		√							
169	87	*Dichrocephala integrifolia*	Asteraceae	Diff. herb	F						√		√							

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170	180	*Dictyospermum montanum*	Commelinaceae	Herb			√						√					√	√	
171	181	*Dictyospermum ovalifolium*	Commelinaceae	Herb			√			√			√					√	√	
172	268	*Didymocarpus tomentosa*	Gesneriaceae	Herb			√					√	√					√	√	
173	427	*Diplocentrum recurvum*	Orchidaceae	Herb				√					√					√	√	
174	428	*Disperis neilgherrensis*	Orchidaceae	Herb						√			√							
175	339	*Disporum leschenaultianum*	Liliaceae	Herb									√					√		
176	567	*Dodonaea viscosa*	Sapindaceae	Shrub	AFS					√	√		√					√	√	
177	378	*Dorstenia indica*	Moraceae	Herb									√					√	√	
178	612	*Droguetia iners* var. *urticoides*	Urticaceae	Herb									√					√		
179	195	*Drosera burmannii*	Droseraceae	Herb	F					√	√	√	√					√	√	
180	196	*Drosera peltata*	Droseraceae	Herb	F					√	√		√				√	√		
181	157	*Drymaria cordata*	Caryophyllaceae	Prost. herb	F					√	√		√					√		√
182	242	*Dumasia villosa*	Fabaceae	Twiner									√					√	√	
183	173	*Dysphania ambrosioides*	Chenopodiaceae	Herb	HF				√		√		√							√
184	503	*Eichhornia crassipes*	Pontederiaceae	Herb	AS				√		√			√						√
185	197	*Elaeagnus kologa*	Elaeagnaceae	Strag. shrub	FS						√		√					√		
186	198	*Elaeocarpus munronii*	Elaeocarpaceae	Large tree			√						√				√	√		
187	199	*Elaeocarpus recurvatus*	Elaeocarpaceae	Tree			√						√				√	√		
188	200	*Elaeocarpus serratus* var. *serratus*	Elaeocarpaceae	Large tree	AFUS						√		√					√	√	

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
189	201	*Elaeocarpus variabilis*	Elaeocarpaceae	Tree	F		√				√		√					√		
190	613	*Elatostema lineolatum* var. *lineolatum*	Urticaceae	Subshrub	F						√		√					√	√	
191	614	*Elatostema sessile*	Urticaceae	Herb	F						√		√					√	√	
192	615	*Elatostema surculosum*	Urticaceae	Herb									√					√	√	
193	190	*Eleocharis congesta*	Cyperaceae	Herb								√	√							
194	383	*Embelia adnata*	Myrsinaceae	Woody climber			√						√					√		
195	384	*Embelia gardneriana*	Myrsinaceae	Woody climber			√			√			√					√		
196	385	*Embelia ribes*	Myrsinaceae	Woody climber	AFHTU						√		√				√	√	√	
197	88	*Emilia ramulosa*	Asteraceae	Herb	F		√			√	√		√							
198	89	*Emilia sonchifolia*	Asteraceae	Herb	AFUS	√				√	√		√							
199	269	*Epithema carnosum* var. *hispida*	Gesneriaceae	Herb			√						√					√	√	
200	480	*Eragrostis nigra*	Poaceae	Herb						√			√					√		
201	481	*Eragrostis unioloides*	Poaceae	Herb	F	√				√	√		√							
202	429	*Eria pauciflora*	Orchidaceae	Herb			√	√					√					√		
203	430	*Eria polystachya*	Orchidaceae	Herb			√	√					√					√	√	
204	90	*Erigeron karvinskianus*	Asteraceae	Herb					√					√				√		
205	204	*Eriocaulon brownianum*	Eriocaulaceae	Herb						√		√	√							
206	205	*Eriocaulon odoratum*	Eriocaulaceae	Herb			√			√		√	√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
207	206	*Eriocaulon robustum*	Eriocaulaceae	Herb			√			√		√	√							
208	390	*Eucalyptus globulus*	Myrtaceae	Large tree	AFHM				√	√	√				√					
209	391	*Eucalyptus grandis*	Myrtaceae	Large tree					√	√					√					
210	482	*Eulalia phaeothrix*	Poaceae	Herb						√			√							
211	164	*Euonymus angulatus*	Celastraceae	Small tree			√						√				√	√	√	
212	165	*Euonymus crenulatus*	Celastraceae	Small tree			√						√					√		
213	166	*Euonymus dichotomus*	Celastraceae	Small tree									√					√		
214	167	*Euonymus serratifolius*	Celastraceae	Shrub			√						√					√		
215	212	*Euphorbia rothiana*	Euphorbiaceae	Subshrub	F					√	√		√					√		
216	605	*Eurya japonica*	Theaceae	Small tree	F						√		√					√	√	
217	257	*Exacum tetragonum*	Gentianaceae	Herb	FUS					√	√		√						√	
218	258	*Exacum wightianum*	Gentianaceae	Subshrub			√			√			√					√		
219	497	*Fagopyrum esculentum*	Polygonaceae	Herb	HM						√		√					√		
220	343	*Fagraea ceilanica*	Loganiaceae	Small tree	F			√			√		√					√	√	
221	379	*Ficus laevis* var. *macrocarpa*	Moraceae	Strag. shrub			√						√							
222	243	*Flemingia grahamiana*	Fabaceae	Shrub	F						√		√					√	√	
223	244	*Flemingia macrophylla*	Fabaceae	Shrub	AF					√	√		√					√	√	
224	245	*Flemingia nilgheriensis*	Fabaceae	Herb			√			√			√					√	√	
225	517	*Fragaria nilgerrensis*	Rosaceae	Herb	F		√			√	√		√					√		
226	91	*Galinsoga parviflora*	Asteraceae	Herb	F				√		√			√						√
227	530	*Gallium asperifolium*	Rubiaceae	Twiner	F						√		√					√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
228	92	*Gamochaeta pensylvanica*	Asteraceae	Herb					√					√						√
229	174	*Garcinia cowa*	Clusiaceae	Tree	A						√		√					√		
230	175	*Garcinia gummi-gutta* var. *gummi-gutta*	Clusiaceae	Tree	AF						√		√					√	√	
231	344	*Gardneria ovata*	Loganiaceae	Climber									√					√	√	
232	202	*Gaultheria fragrantissima*	Ericaceae	Shrub	AF					√	√		√					√		
233	259	*Gentiana pedicellata* var. *wightii*	Gentianaceae	Herb						√			√					√		
234	260	*Gentiana quadrifaria* var. *zeylanica*	Gentianaceae	Herb						√		√	√							
235	266	*Geranium nepalense*	Geraniaceae	Herb	F					√	√		√							
236	616	*Girardinia diversifolia*	Urticaceae	Subshrub	F						√		√					√		
237	640	*Globba marantina*	Zingiberaceae	Herb	F						√		√					√	√	
238	213	*Glochidion candolleanum*	Euphorbiaceae	Tree									√					√		
239	214	*Glochidion ellipticum*	Euphorbiaceae	Tree	F		√				√		√					√	√	
240	215	*Glochidion heyneanum*	Euphorbiaceae	Tree									√					√	√	
241	608	*Gnidia glauca*	Thymeleaceae	Small tree	F					√	√		√					√	√	
242	282	*Gomphandra coriacea*	Icacinaceae	Small tree									√					√	√	
243	606	*Gordonia obtusa*	Theaceae	Large tree	FS		√				√		√					√	√	
244	59	*Gymnema hirsutum*	Asclepiadaceae	Climber	F		√				√		√					√	√	
245	60	*Gymnema indicum*	Asclepiadaceae	Twiner			√						√					√	√	
246	93	*Gynura nitida*	Asteraceae	Herb			√			√			√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
247	94	*Gynura travancorica*	Asteraceae	Herb			√			√			√							
248	431	*Habenaria brachyphylla*	Orchidaceae	Herb			√			√			√							
249	432	*Habenaria cephalotes*	Orchidaceae	Herb			√			√			√							
250	433	*Habenaria digitata*	Orchidaceae	Herb						√			√							
251	434	*Habenaria elliptica*	Orchidaceae	Herb			√			√			√							
252	435	*Habenaria foliosa*	Orchidaceae	Herb			√			√			√							
253	436	*Habenaria heyneana*	Orchidaceae	Herb			√			√			√							
254	437	*Habenaria longicorniculata*	Orchidaceae	Herb	A		√			√	√		√							
255	438	*Habenaria longicornu*	Orchidaceae	Herb			√			√			√							
256	439	*Habenaria rariflora*	Orchidaceae	Herb	A		√			√	√		√							
257	261	*Halenia perrottetii*	Gentianaceae	Herb			√			√			√							√
258	641	*Hedychium spicatum*	Zingiberaceae	Shrub	AFTU		√				√	√	√					√	√	
259	531	*Hedyotis articularis* var. *articularis*	Rubiaceae	Shrub	F		√			√	√		√							
260	532	*Hedyotis bourdillonii*	Rubiaceae	Shrub			√			√			√				√			
261	533	*Hedyotis hirsutissima*	Rubiaceae	Shrub			√			√			√				√	√		
262	534	*Hedyotis leschenaultiana* var. *leschenaultiana*	Rubiaceae	Shrub			√						√					√		
263	95	*Helichrysum bracteatum*	Asteraceae	Herb					√					√						
264	96	*Helichrysum buddleioides*	Asteraceae	Subshrub									√					√	√	
265	348	*Helixanthera obtusata*	Loranthaceae	Shrub			√						√			√		√	√	
266	33	*Heracleum candolleanum*	Apiaceae	Shrub	F		√			√	√		√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
267	34	*Heracleum rigens*	Apiaceae	Herb	F		√			√	√		√							
268	35	*Heracleum sprengelianum*	Apiaceae	Herb			√			√			√							
269	255	*Hydnocarpus alpina*	Flacourtiaceae	Large tree	F						√		√				√		√	
270	275	*Hydrilla verticillata*	Hydrocharitaceae	Herb	FS						√	√	√							
271	36	*Hydrocotyle conferta*	Apiaceae	Pros. herb			√						√					√		
272	37	*Hydrocotyle javanica*	Apiaceae	Pros. herb	F						√		√					√	√	
273	38	*Hydrocotyle sibthorpioides*	Apiaceae	Creep.herb	F						√	√	√					√		
274	276	*Hypericum hookerianum*	Hypericaceae	Shrub									√					√		
275	277	*Hypericum japonicum*	Hypericaceae	Herb	F						√	√	√					√		
276	278	*Hypericum mysurense*	Hypericaceae	Shrub									√					√	√	
277	279	*Hypericum wightianum*	Hypericaceae	Herb								√	√					√		
278	97	*Hypochoeris glabra*	Asteraceae	Herb					√	√				√						√
279	281	*Hypoxis aurea*	Hypoxidaceae	Herb	A					√	√		√							
280	44	*Ilex denticulata*	Aquifoliaceae	Large tree									√					√		
281	45	*Ilex gardneriana*	Aquifoliaceae	Tree			√						√					√		
282	46	*Ilex walkeri*	Aquifoliaceae	Tree									√					√		
283	47	*Ilex wightiana* var. *wightiana*	Aquifoliaceae	Large tree								√	√					√		
284	115	*Impatiens campanulata*	Balsaminaceae	Sub shrub			√						√					√		
285	116	*Impatiens chinensis*	Balsaminaceae	Herb	F						√		√					√		
286	117	*Impatiens clavicornu*	Balsaminaceae	Herb			√			√			√					√		
287	118	*Impatiens cordata*	Balsaminaceae	Herb			√						√					√		

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288	119	*Impatiens fruticosa*	Balsaminaceae	Subshrub			√			√			√					√		
289	120	*Impatiens gardneriana*	Balsaminaceae	Herb			√						√					√		
290	121	*Impatiens goughii*	Balsaminaceae	Herb			√			√			√					√		
291	122	*Impatiens hensloviana*	Balsaminaceae	Shrub	F						√		√					√		
292	123	*Impatiens inconspicua*	Balsaminaceae	Herb			√			√			√					√		
293	124	*Impatiens latifolia*	Balsaminaceae	Shrub	F		√				√		√					√		
294	125	*Impatiens leschenaultii*	Balsaminaceae	Under shrub			√						√					√		
295	126	*Impatiens levingei*	Balsaminaceae	Herb			√						√					√		
296	127	*Impatiens minor*	Balsaminaceae	Herb	F		√				√		√					√		
297	128	*Impatiens modesta*	Balsaminaceae	Herb	0		√						√					√		
298	129	*Impatiens orchioides*	Balsaminaceae	Herb	0		√	√					√					√		
299	130	*Impatiens parasitica*	Balsaminaceae	Herb			√	√					√					√		
300	131	*Impatiens phoenicea*	Balsaminaceae	Herb			√						√					√		
301	132	*Impatiens rufescens*	Balsaminaceae	Herb			√						√					√		
302	133	*Impatiens tomentosa*	Balsaminaceae	Herb			√						√					√		
303	246	*Indigofera cassioides*	Fabaceae	Shrub	F					√	√		√							
304	247	*Indigofera pedicellata*	Fabaceae	Prost. herb						√			√							
305	185	*Ipomoea purpurea*	Convolvulaceae	Twiner	F				√		√			√						
306	483	*Isachne kunthiana*	Poaceae	Herb									√					√		
307	484	*Ischaemum indicum* ssp. *indicum* var. *villosum*	Poaceae	Herb						√			√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
308	289	*Isodon coesta*	Lamiaceae	Herb	F						√		√					√	√	
309	290	*Isodon nilgherricus*	Lamiaceae	Shrub	F		√			√	√		√				√	√		
310	291	*Isodon wightii*	Lamiaceae	Subshrub			√			√			√					√	√	
311	568	*Isonandra perrottetiana*	Sapotaceae	Tree			√						√					√	√	
312	535	*Ixora notoniana*	Rubiaceae	Small tree			√						√					√	√	
313	401	*Jasminum bignoniaceum*	Oleaceae	Subshrub	AU				√		√			√				√		
314	402	*Jasminum brevilobum*	Oleaceae	Woody climber			√						√					√	√	
315	403	*Jasminum coarctatum*	Oleaceae	Strag. shrub						√			√					√	√	
316	404	*Jasminum cuspidatum*	Oleaceae	Shrub									√						√	
317	405	*Jasminum flexile* var. *flexile*	Oleaceae	Climber	AS						√		√					√		
318	406	*Jasminum mesnyi*	Oleaceae	Shrub					√						√					
319	285	*Juncus inflexus*	Juncaceae	Herb	F						√	√	√							
320	286	*Juncus prismatocarpus* ssp. *leschenaultii*	Juncaceae	Herb	F						√	√	√							
321	6	*Justicia japonica*	Acanthaceae	Decum. herb	F					√	√		√					√		
322	7	*Justicia nilgherrensis*	Acanthaceae	Procum. herb			√			√			√							
323	186	*Kalanchoe grandiflora*	Crassulaceae	Herb	F		√				√		√							
324	98	*Kleinia walkeri*	Asteraceae	Sub shrub									√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
325	536	*Knoxia sumatrensis* var. *sumatrensis*	Rubiaceae	Diff. herb								√	√					√		
326	537	*Knoxia wightiana*	Rubiaceae	Herb			√					√	√					√		
327	634	*Korthalsella japonica*	Viscaceae	Herb									√			√		√		
328	191	*Kyllinga melanosperma* var. *melanosperma*	Cyperaceae	Herb								√	√							
329	617	*Laportea bulbifera*	Urticaceae	Herb	F						√		√					√		
330	538	*Lasianthus acuminatus*	Rubiaceae	Shrub			√						√					√		
331	539	*Lasianthus blumeanus*	Rubiaceae	Shrub			√						√					√		
332	540	*Lasianthus venulosus*	Rubiaceae	Small tree			√						√					√		
333	99	*Launaea acaulis*	Asteraceae	Herb	AS					√	√		√							
334	273	*Laurembergia coccinea*	Haloragaceae	Procum. herb								√	√							
335	292	*Leucas beddomei*	Lamiaceae	Under shrub			√			√			√							
336	293	*Leucas helianthemifolia*	Lamiaceae	Subshrub			√			√			√							
337	294	*Leucas hirta*	Lamiaceae	Herb	F		√			√	√		√							
338	295	*Leucas lamiifolia*	Lamiaceae	Shrub			√			√			√							
339	296	*Leucas lanceifolia*	Lamiaceae	Shrub			√			√			√							
340	297	*Leucas rosmarinifolia*	Lamiaceae	Shrub			√			√			√							
341	298	*Leucas sebaldiana*	Lamiaceae	Strag.herb			√			√			√							
342	299	*Leucas suffruticosa*	Lamiaceae	Under shrub			√			√			√							

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343	300	*Leucas vestita* var. *angustifolia*	Lamiaceae	Herb	F		√			√	√		√							
344	407	*Ligustrum perrottetii*	Oleaceae	Small tree			√			√			√					√		
345	408	*Ligustrum robustum* ssp. *walkeri*	Oleaceae	Tree	F					√	√		√					√	√	
346	340	*Lilium wallichianum* var. *neilgherrense*	Liliaceae	Herb	F		√			√	√		√					√		
347	571	*Lindernia hyssopioides*	Scrophulariaceae	Herb	AF	√					√	√	√					√		
348	341	*Linum mysorense*	Linaceae	Herb						√			√							
349	440	*Liparis viridiflora*	Orchidaceae	Herb				√		√			√					√		
350	328	*Litsea floribunda*	Lauraceae	Tree			√						√					√		
351	329	*Litsea myristicaefolia*	Lauraceae	Tree									√					√	√	
352	330	*Litsea quinqueflora*	Lauraceae	Tree			√						√					√	√	
353	331	*Litsea wightiana* var. *wightiana*	Lauraceae	Large tree			√						√					√		
354	342	*Lobelia leschenaultiana*	Lobeliaceae	Shrub	F					√	√		√					√	√	
355	150	*Lonicera leschenaultii*	Caprifoliaceae	Climber			√						√					√		
356	151	*Lonicera ligustrina*	Caprifoliaceae	Shrub								√	√					√		
357	411	*Ludwigia octovalvis* ssp. *sessiliflora*	Onagraceae	Herb	A						√	√	√					√	√	
358	441	*Luisia birchea*	Orchidaceae	Herb	F			√					√					√	√	
359	587	*Lycianthes laevis* ssp. *laevis*	Solanaceae	Sub shrub	F						√		√					√		

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360	505	*Lysimachia procumbens*	Primulaceae	Herb						√	√		√							
361	216	*Macaranga indica*	Euphorbiaceae	Tree	FS						√		√					√	√	
362	349	*Macrosolen parasiticus*	Loranthaceae	Shrub	F						√		√			√		√	√	
363	386	*Maesa indica*	Myrsinaceae	Shrub	F					√	√		√					√	√	
364	354	*Magnolia nilagirica*	Magnoliaceae	Large tree	F								√				√	√		
365	135	*Mahonia leschenaultii*	Berberidaceae	Small tree	F		√				√		√					√		
366	217	*Mallotus philippensis*	Euphorbiaceae	Tree	AFHSU	√				√	√		√						√	
367	168	*Maytenus ovata*	Celastraceae	Shrub			√			√			√						√	
368	557	*Melicope lunu-ankenda*	Rutaceae	Large tree	AF						√		√					√		
369	560	*Meliosma pinnata* ssp. *barbulata*	Sabiaceae	Large tree									√					√	√	
370	561	*Meliosma simplicifolia* ssp. *simplicifolia*	Sabiaceae	Tree									√					√		
371	562	*Meliosma simplicifolia* var. *pungens*	Sabiaceae	Large tree									√					√		
372	360	*Memecylon randerianum*	Melastomataceae	Shrub	FS		√				√		√					√	√	
373	361	*Memecylon sisparense*	Melastomataceae	Small tree			√						√				√	√		
374	301	*Micromeria imbricata*	Lamiaceae	Herb	F						√		√					√	√	
375	169	*Microtropis microcarpa* var. *densiflora*	Celastraceae	Strag. shrub			√						√					√	√	
376	170	*Microtropis microcarpa* var. *microcarpa*	Celastraceae	Small tree			√						√					√		
377	171	*Microtropis ramiflora*	Celastraceae	Small tree									√					√	√	

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
378	357	*Modiola caroliniana*	Malvaceae	Prost. herb					√					√						
379	100	*Moonia heterophylla*	Asteraceae	Subshrub									√					√		
380	182	*Murdannia lanuginosa*	Commelinaceae	Herb			√			√			√					√	√	
381	101	*Myriactis wightii* var. *wightii*	Asteraceae	Herb									√					√		
382	274	*Myriophyllum oliganthum*	Haloragaceae	Herb			√					√	√							
383	387	*Myrsine wightiana*	Myrsinaceae	Tree									√					√		
384	541	*Neanotis indica* var. *indica*	Rubiaceae	Diff. herb			√			√			√					√		
385	542	*Neanotis monosperma*	Rubiaceae	Prost.herb			√						√					√		
386	332	*Neolitsea cassia*	Lauraceae	Large tree	F						√		√					√	√	
387	333	*Neolitsea scrobiculata*	Lauraceae	Tree	FS		√			√	√		√					√	√	
388	588	*Nicandra physalodes*	Solanaceae	Subshrub	F				√		√			√						√
389	283	*Nothapodytes nimmoniana*	Icacinaceae	Small tree	FM						√		√				√	√	√	
390	399	*Nymphaea nouchali*	Nymphaeaceae	Herb	AF	√					√		√							
391	442	*Oberonia brunoniana*	Orchidaceae	Herb			√	√					√					√		
392	443	*Oberonia verticillata*	Orchidaceae	Herb				√					√					√		
393	444	*Oberonia wightiana*	Orchidaceae	Herb				√					√					√		
394	412	*Oenothera rosea*	Onagraceae	Herb					√			√		√				√		
395	543	*Oldenlandia auricularia*	Rubiaceae	Diff. herb	A						√		√							
396	409	*Olea paniculata*	Oleaceae	Large tree	F						√		√					√		
397	271	*Ophiopogon intermedius*	Haemodoraceae	Herb	F		√			√	√		√					√	√	
398	544	*Ophiorrhiza brunonis* var. *brunonis*	Rubiaceae	Subshrub			√						√				√	√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
399	485	*Oplismenus undulatifolius*	Poaceae	Herb									√					√		
400	362	*Osbeckia aspera* var. *aspera*	Melastomataceae	Shrub	AFS		√			√	√		√					√	√	
401	363	*Osbeckia brachystemon*	Melastomataceae	Herb			√			√			√					√		
402	364	*Osbeckia cupularis*	Melastomataceae	Shrub	F		√			√	√		√					√		
403	365	*Osbeckia gracilis*	Melastomataceae	Shrub			√			√			√					√	√	
404	366	*Osbeckia reticulata*	Melastomataceae	Shrub			√			√			√					√		
405	564	*Osyris quadripartita*	Santalaceae	Shrub	F					√	√		√							
406	457	*Oxalis corniculata*	Oxalidaceae	Prost.herb	AFUS	√				√	√		√					√		
407	458	*Oxalis dehradunensis*	Oxalidaceae	Herb					√					√				√		√
408	486	*Oxytenanthera monadelpha*	Poaceae	Subshrub									√					√	√	
409	572	*Parasopubia delphiniifolia*	Scrophulariaceae	Herb	F					√	√		√							
410	459	*Parnassia mysorensis*	Parnassiaceae	Herb								√	√					√		
411	460	*Parnassia wightiana*	Parnassiaceae	Herb								√	√							
412	248	*Parochetus communis*	Fabaceae	Trail.herb	F						√		√					√		
413	462	*Passiflora mollissima*	Passifloraceae	Climber					√					√				√		
414	463	*Passiflora subpeltata*	Passifloraceae	Climber					√					√				√		
415	545	*Pavetta breviflora* var. *breviflora*	Rubiaceae	Shrub			√						√					√		
416	445	*Pecteilis gigantea*	Orchidaceae	Herb	F					√	√		√							
417	573	*Pedicularis zeylanica*	Scrophulariaceae	Herb					√			√								
418	272	*Peliosanthes teta* ssp. *humilis*	Haemodoraceae	Herb	F						√		√					√	√	

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
419	487	*Pennisetum clandestinum*	Poaceae	Herb					√					√				√		
420	465	*Peperomia blanda*	Piperaceae	Herb			√						√					√	√	
421	466	*Peperomia tetraphylla*	Piperaceae	Herb	F			√			√		√					√		
422	446	*Peristylus richardianus*	Orchidaceae	Herb	F					√	√		√					√		
423	498	*Persicaria chinensis*	Polygonaceae	Subshrub	F						√		√					√	√	
424	499	*Persicaria nepalensis*	Polygonaceae	Diff.herb	F						√	√	√					√		
425	500	*Persicaria pulchra*	Polygonaceae	Herb	F						√		√					√		
426	501	*Persicaria strigosa*	Polygonaceae	Herb	F						√	√	√					√		
427	334	*Phoebe wightii*	Lauraceae	Large tree			√						√					√	√	
428	57	*Phoenix loureiroi* var. *loureiroi*	Arecaceae	Shrub	AS					√	√		√							
429	518	*Photinia integrifolia* var. *sublanceolata*	Rosaceae	Tree									√					√		
430	519	*Photinia serratifolia* var. *serratifolia*	Rosaceae	Tree			√						√					√		
431	218	*Phyllanthus macraei*	Euphorbiaceae	Shrub	F		√				√		√					√	√	
432	219	*Phyllanthus rheedei*	Euphorbiaceae	Herb	F						√		√					√	√	
433	589	*Physalis peruviana*	Solanaceae	Herb	AS				√		√			√				√		
434	464	*Phytolacca octandra*	Phytolacaceae	Shrub					√					√				√		
435	102	*Picris hieracioides*	Asteraceae	Herb	F					√	√		√							
436	618	*Pilea melastomoides*	Urticaceae	Subshrub									√					√		
437	619	*Pilea wightii*	Urticaceae	Herb									√					√	√	
438	39	*Pimpinella candolleana*	Apiaceae	Herb			√			√			√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
439	40	*Pimpinella leschenaultii*	Apiaceae	Herb						√			√							
440	467	*Piper mullesua*	Piperaceae	Climber	A			√			√		√				√	√	√	
441	468	*Piper schmidtii*	Piperaceae	Climber			√	√					√					√		
442	469	*Piper wightii*	Piperaceae	Climber			√	√					√					√	√	
443	470	*Pittosporum dasycaulon*	Pittosporaceae	Tree	F		√				√		√					√	√	
444	471	*Pittosporum neelgherrense*	Pittosporaceae	Tree	F		√				√		√					√	√	
445	472	*Pittosporum tetraspermum*	Pittosporaceae	Shrub	F						√		√					√		
446	473	*Plantago erosa*	Plantagianaceae	Herb	F						√		√					√		
447	302	*Plectranthus barbatus*	Lamiaceae	Herb	A						√		√					√	√	
448	303	*Plectranthus glabratus*	Lamiaceae	Subshrub			√						√					√	√	
449	304	*Plectranthus inflatus*	Lamiaceae	Herb						√			√					√	√	
450	546	*Pleiocraterium verticillare*	Rubiaceae	Herb						√			√							
451	488	*Poa annua*	Poaceae	Herb						√			√					√		√
452	305	*Pogostemon auricularius*	Lamiaceae	Scand. herb	F						√		√					√	√	
453	306	*Pogostemon benghalensis*	Lamiaceae	Scand. herb	F		√				√		√					√	√	
454	307	*Pogostemon mollis*	Lamiaceae	Subshrub			√			√			√					√	√	
455	308	*Pogostemon pubescens*	Lamiaceae	Shrub	F						√		√					√	√	
456	309	*Pogostemon speciosus*	Lamiaceae	Shrub			√						√					√	√	
457	310	*Pogostemon wightii*	Lamiaceae	Subshrub			√						√					√	√	
458	158	*Polycarpon tetraphyllum*	Caryophyllaceae	Herb					√					√						√

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
459	492	*Polygala arillata*	Polygalaceae	Shrub	F						√		√					√		
460	493	*Polygala bolbothrix*	Polygalaceae	Diff.herb			√			√			√							
461	494	*Polygala javana*	Polygalaceae	Herb						√			√							
462	495	*Polygala rosmarinifolia*	Polygalaceae	Herb						√			√							
463	496	*Polygala sibirica*	Polygalaceae	Diff.herb	F					√	√		√							
464	504	*Potamogeton nodosus*	Potomoge-tonaceae	Herb						√			√							
465	520	*Potentilla leschenaultiana*	Rosaceae	Herb									√					√		
466	620	*Pouzolzia bennettiana* var. *bennettiana*	Urticaceae	Subshrub	F					√	√		√					√	√	
467	621	*Pouzolzia wightii*	Urticaceae	Herb			√			√			√					√		
468	521	*Prinsepia utilis*	Rosaceae	Shrub	F						√		√					√		
469	622	*Procris crenata*	Urticaceae	Herb				√					√					√	√	
470	522	*Prunus ceylanica*	Rosaceae	Large tree	F						√		√					√	√	
471	547	*Psychotria bisulcata*	Rubiaceae	Subshrub									√					√	√	
472	548	*Psychotria nilgiriensis* var. *nilgiriensis*	Rubiaceae	Shrub			√						√					√		
473	549	*Psychotria sohmeri*	Rubiaceae	Shrub									√					√	√	
474	550	*Psychotria truncata*	Rubiaceae	Shrub			√						√					√	√	
475	377	*Racosperma melanoxylon*	Mimosaceae	Large tree					√					√	√			√		
476	510	*Ranunculus diffusus*	Ranunculaceae	Herb	F		√				√		√					√		
477	511	*Ranunculus reniformis*	Ranunculaceae	Herb			√						√					√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
478	512	*Ranunculus wallichianus*	Ranunculaceae	Herb			√						√					√		
479	388	*Rapanea capitellata* var. *capitellata*	Myrsinaceae	Tree						√			√					√	√	
480	389	*Rapanea daphnoides*	Myrsinaceae	Shrub			√			√			√					√	√	
481	43	*Rauvolfia verticillata*	Apocynaceae	Shrub									√					√	√	
482	514	*Rhamnus virgatus*	Rhamnaceae	Shrub	F						√		√					√		
483	515	*Rhamnus wightii*	Rhamnaceae	Strag. shrub	AFS						√		√					√		
484	203	*Rhododendron arboreum* ssp. *nilagiricum*	Ericaceae	Tree	AFTUS		√				√		√					√		
485	392	*Rhodomyrtus tomentosa*	Myrtaceae	Shrub	F					√	√		√					√		
486	270	*Rhynchoglossum notonianum*	Gesneriaceae	Herb	FS					√	√		√					√	√	
487	447	*Robiquetia virescens*	Orchidaceae	Herb				√					√					√	√	
488	523	*Rosa leschenaultiana*	Rosaceae	Scan.shrub	F		√				√		√					√		
489	353	*Rotala rotundifolia*	Lythraceae	Herb							√	√	√							
490	629	*Rotheca serrata*	Verbenaceae	Shrub	AFTUS		√			√	√		√						√	
491	551	*Rubia cordifolia*	Rubiaceae	Climber	AFSTU						√		√					√	√	
492	524	*Rubus ellipticus*	Rosaceae	Strag. shrub	F						√		√					√		
493	525	*Rubus fairholmianus*	Rosaceae	Strag. shrub									√					√		
494	526	*Rubus glomeratus*	Rosaceae	Strag. shrub			√						√					√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
495	527	*Rubus niveus*	Rosaceae	Strag. shrub	F						√		√					√	√	
496	502	*Rumex nepalense*	Polygonaceae	Herb	F						√		√					√		√
497	563	*Salix tetrasperma*	Salicaceae	Large tree	AFUS						√	√	√					√		
498	311	*Salvia leucantha*	Lamiaceae	Subshrub					√	√				√						
499	41	*Sanicula elata*	Apiaceae	Herb						√			√							
500	552	*Saprosma foetens*	Rubiaceae	Small tree			√						√					√	√	
501	144	*Sarcococca saligna*	Buxaceae	Shrub	F						√		√					√	√	
502	448	*Satyrium nepalense*	Orchidaceae	Herb	F					√	√		√							
503	53	*Schefflera capitata*	Araliaceae	Small tree			√						√					√		
504	54	*Schefflera racemosa*	Araliaceae	Small tree			√			√			√					√		
505	55	*Schefflera rostrata*	Araliaceae	Small tree			√	√					√					√	√	
506	56	*Schefflera stellata*	Araliaceae	Strag. shrub	F						√		√					√		
507	192	*Schoenoplectiella articulata*	Cyperaceae	Herb								√	√							
508	193	*Schoenoplectus mucronatus*	Cyperaceae	Herb					√					√						
509	256	*Scolopia crenata*	Flacourtiaceae	Large tree									√						√	\
510	312	*Scutellaria barbata*	Lamiaceae	Herb						√			√							
511	313	*Scutellaria violacea*	Lamiaceae	Herb									√					√		
512	314	*Scutellaria wightiana*	Lamiaceae	Herb			√						√					√		
513	449	*Seidenfadeniella filiformis*	Orchidaceae	Herb				√					√					√		
514	450	*Seidenfia densiflora*	Orchidaceae	Herb						√			√					√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
515	451	*Seidenfia rheedei*	Orchidaceae	Herb	F						√		√					√		
516	452	*Seidenfia versicolor*	Orchidaceae	Herb	F						√		√					√		
517	103	*Senecio lavandulaefolius*	Asteraceae	Herb			√			√			√							
518	104	*Senecio lessingianus*	Asteraceae	Herb			√						√					√		
519	105	*Senecio multiceps*	Asteraceae	Herb			√						√					√		
520	106	*Senecio scandens*	Asteraceae	Climber	F						√		√					√		
521	107	*Senecio wightii*	Asteraceae	Herb									√					√		
522	108	*Senecio zeylanicus*	Asteraceae	Herb						√			√					√		
523	147	*Senna didymobotrya*	Caesalpiniaceae	Shrub					√					√	√					
524	148	*Senna septemtrionalis* var. *pubescens*	Caesalpiniaceae	Shrub			√						√							
525	489	*Setaria pumila*	Poaceae	Herb						√			√					√	√	
526	249	*Shuteria involucrata*	Fabaceae	Twiner						√			√					√		
527	358	*Sida rhomboidea*	Malvaceae	Subshrub	A		√				√		√							
528	109	*Sigesbeckia orientalis*	Asteraceae	Herb	FS						√		√							
529	159	*Silene gallica*	Caryophyllaceae	Herb					√					√						√
530	453	*Sirhookera latifolia*	Orchidaceae	Herb				√					√					√		
531	284	*Sisyrinchium rosulatum*	Iridaceae	Herb						√			√							
532	579	*Smilax aspera*	Smilacaceae	Climber	AF						√		√					√		
533	580	*Smilax wightii*	Smilacaceae	Climber	F		√				√		√					√	√	
534	250	*Smithia blanda*	Fabaceae	Pros. herb			√			√		√	√					√		
535	590	*Solanum americanum*	Solanaceae	Herb	AF						√		√					√	√	√

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
536	591	*Solanum denticulatum*	Solanaceae	Shrub	FS						√		√					√		
537	592	*Solanum erianthum*	Solanaceae	Shrub	AF						√		√					√	√	
538	593	*Solanum jasminoides*	Solanaceae	Climber					√					√				√	√	
539	594	*Solanum mauritianum*	Solanaceae	Shrub	F				√		√			√				√		
540	595	*Solanum pseudo-capsicum*	Solanaceae	Shrub	H				√	√	√			√				√		
541	596	*Solanum sisymbrifolium*	Solanaceae	Under shrub	FS				√		√			√				√		
542	597	*Solanum torvum*	Solanaceae	Shrub	AFS	√					√		√						√	
543	598	*Solanum violaceum* ssp. *multiflorum*	Solanaceae	Subshrub	AF		√				√		√					√		
544	599	*Solanum virginianum*	Solanaceae	Subshrub	A					√	√		√					√	√	
545	367	*Sonerila grandiflora*	Melastomataceae	Herb			√						√					√	√	
546	368	*Sonerila speciosa*	Melastomataceae	Herb			√						√					√		
547	369	*Sonerila wallichii*	Melastomataceae	Herb			√						√					√		
548	251	*Sophora velutina*	Fabaceae	Shrub						√			√							
549	574	*Sopubia trifida*	Scrophulariaceae	Herb						√			√							
550	160	*Spergula arvensis*	Caryophyllaceae	Herb	F						√		√							√
551	553	*Spermacoce hispida*	Rubiaceae	Herb	AFS	√	√				√		√							√
552	554	*Spermacoce ocymoides*	Rubiaceae	Herb		√							√							
553	454	*Spiranthes sinensis*	Orchidaceae	Herb								√	√					√		
554	161	*Stellaria media*	Caryophyllaceae	Herb	H						√		√					√	√	√
555	373	*Stephania japonica* var. *japonica*	Menispermaceae	Climber	AFS					√	√		√							

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
556	374	*Stephania wightii*	Menispermaceae	Creep herb	F					√	√		√							
557	575	*Striga asiatica*	Scrophulariaceae	Herb	AFS					√	√		√			√				
558	8	*Strobilanthes barbatus*	Acanthaceae	Shrub			√						√					√	√	
559	9	*Strobilanthes cuspidatus*	Acanthaceae	Shrub			√						√					√	√	
560	10	*Strobilanthes foliosus*	Acanthaceae	Shrub			√			√			√					√		
561	11	*Strobilanthes gracilis*	Acanthaceae	Shrub			√			√			√					√		
562	12	*Strobilanthes heyneanus*	Acanthaceae	Shrub	A					√	√		√					√	√	
563	13	*Strobilanthes homotropus*	Acanthaceae	Shrub			√						√					√		
564	14	*Strobilanthes kunthianus*	Acanthaceae	Shrub			√			√			√					√		
565	15	*Strobilanthes lanatus*	Acanthaceae	Shrub			√						√					√		
566	16	*Strobilanthes luridus*	Acanthaceae	Strag. shrub			√						√					√	√	
567	17	*Strobilanthes micranthus*	Acanthaceae	Shrub			√						√					√	√	
568	18	*Strobilanthes neilgherrensis*	Acanthaceae	Shrub			√						√					√		
569	19	*Strobilanthes neoasper*	Acanthaceae	Shrub			√			√			√					√		
570	20	*Strobilanthes papillosus*	Acanthaceae	Shrub			√						√					√		
571	21	*Strobilanthes pulneyensis*	Acanthaceae	Shrub			√						√					√		
572	22	*Strobilanthes sessilis* var. *sessilis*	Acanthaceae	Subshrub			√			√			√					√	√	
573	23	*Strobilanthes wightianus*	Acanthaceae	Shrub	F		√				√		√					√		
574	24	*Strobilanthes zenkerianus*	Acanthaceae	Shrub			√						√					√		

Sl. No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
575	262	*Swertia angustifolia* var. *pulchella*	Gentianaceae	Herb	AU					√	√		√					√	√	
576	263	*Swertia corymbosa*	Gentianaceae	Herb	AF		√			√	√		√				√	√		
577	264	*Swertia lawii*	Gentianaceae	Herb	AU		√			√	√		√				√	√	√	
578	265	*Swertia minor*	Gentianaceae	Herb	F		√			√	√		√					√		
579	601	*Symplocos cochinchinensis* ssp. *laurina*	Symplocaceae	Tree	A					√	√		√				√	√	√	
580	602	*Symplocos foliosa*	Symplocaceae	Tree			√			√			√					√		
581	603	*Symplocos obtusa*	Symplocaceae	Tree						√			√					√		
582	604	*Symplocos pendula*	Symplocaceae	Tree						√			√					√		
583	393	*Syzygium calophyllifolium*	Myrtaceae	Large tree	F						√		√					√		
584	394	*Syzygium cumini*	Myrtaceae	Large tree	AFHTU	√					√		√					√	√	
585	395	*Syzygium densiflorum*	Myrtaceae	Tree			√						√					√		
586	396	*Syzygium grande*	Myrtaceae	Tree									√					√	√	
587	397	*Syzygium hemisphericum*	Myrtaceae	Large tree									√					√	√	
588	398	*Syzygium lanceolatum*	Myrtaceae	Large tree									√						√	
589	110	*Taraxacum javanicum*	Asteraceae	Pros.herb						√			√							
590	350	*Taxillus cuneatus*	Loranthaceae	Shrub									√			√		√	√	
591	351	*Taxillus recurvus*	Loranthaceae	Shrub			√						√			√		√	√	
592	352	*Taxillus tomentosus*	Loranthaceae	Shrub									√			√				
593	607	*Ternstroemia gymnanthera*	Theaceae	Tree	F						√		√					√		

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
594	637	*Tetrastigma leucostaphylum*	Vitaceae	Climber	FS						√		√					√	√	
595	315	*Teucrium tomentosum*	Lamiaceae	Shrub						√			√					√	√	
596	513	*Thalictrum javanicum*	Ranunculaceae	Herb	F					√	√		√					√		
597	490	*Themeda triandra*	Poaceae	Herb	F					√	√		√							
598	565	*Thesium wightianum*	Santalaceae	Herb			√			√			√							
599	25	*Thunbergia tomentosa*	Acanthaceae	Twiner			√						√					√	√	
600	558	*Toddalia asiatica*	Rutaceae	Woody climber	AFS	√					√		√					√	√	
601	576	*Torenia travancorica*	Scrophulariaceae	Herb	A						√		√					√	√	
602	611	*Trema orientalis*	Ulmaceae	Tree	AFS	√					√		√						√	
603	372	*Trichilia connaroides*	Meliaceae	Small tree	F						√		√							
604	455	*Trichoglottis tenera*	Orchidaceae	Shrub				√					√					√		
605	252	*Trifolium dubium*	Fabaceae	Pros. herb					√	√				√						√
606	253	*Trifolium repens*	Fabaceae	Herb	H				√	√	√			√						√
607	600	*Turpinia cochinchinensis*	Staphyleaceae	Tree	F						√		√					√		
608	254	*Ulex europeaus*	Fabaceae	Shrub					√	√				√						
609	359	*Urena lobata* var. *lobata*	Malvaceae	Sub shrub	AFS	√					√		√							√
610	623	*Urtica dioica*	Urticaceae	Herb	AH						√		√							√
611	335	*Utricularia caerulea*	Lentibulariaceae	Herb								√	√							
612	336	*Utricularia scandens*	Lentibulariaceae	Herb								√	√							
613	624	*Vaccinium leschenaultii*	Vacciniaceae	Large tree			√						√					√		
614	625	*Vaccinium neilgherrense*	Vacciniaceae	Small tree			√						√					√	√	

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
615	626	*Valeriana hardwickii* var. *arnottiana*	Valerianaceae	Herb	AU					√	√		√							
616	627	*Valeriana hookeriana*	Valerianaceae	Herb			√			√			√							
617	628	*Valeriana leschenaultii*	Valerianaceae	Herb	F		√			√	√		√				√			
618	42	*Vanasushava pedata*	Apiaceae	Pro. herb			√			√			√				√	√		
619	577	*Verbascum thapsus*	Scrophulariaceae	Herb	H				√	√	√			√						
620	630	*Verbena bonariensis*	Verbenaceae	Under shrub					√	√										√
621	111	*Vernonia arborea*	Asteraceae	Small tree	F						√							√	√	
622	112	*Vernonia conyzoides*	Asteraceae	Herb			√						√					√		
623	113	*Vernonia pectiniformis*	Asteraceae	Under shrub									√					√		
624	578	*Veronica polita*	Scrophulariaceae	Herb	F						√			√				√		√
625	152	*Viburnum coriaceum*	Caprifoliaceae	Tree	A						√		√					√	√	
626	153	*Viburnum erubescens*	Caprifoliaceae	Shrub									√					√		
627	154	*Viburnum punctatum*	Caprifoliaceae	Tree	A						√		√					√	√	
628	631	*Viola betonicifolia*	Violaceae	Herb	F					√	√		√					√		
629	632	*Viola hamiltoniana*	Violaceae	Herb						√			√					√		
630	633	*Viola pilosa Blume*	Violaceae	Pros. herb	F						√		√					√		
631	635	*Viscum heyneanum*	Viscaceae	Herb									√			√		√	√	
632	491	*Vulpia myuros*	Poaceae	Herb					√	√				√						√
633	149	*Wahlenbergia marginata*	Campanulaceae	Herb	F					√	√		√							

Sl . No.	Sp. No.	Botanical name	Family	Habit	Med Tag	ATF	E	EP	EX	G	M	MA	N	NA	P	PA	RL	S	SE	W
634	61	*Wattakaka volubilis*	Asclepiadaceae	Climber	AS	√					√		√					√	√	
635	555	*Wendlandia thyrsoidea*	Rubiaceae	Small tree						√			√							
636	569	*Xantolis tomentosa*	Sapotaceae	Large tree	AF						√		√					√		
637	638	*Xyris capensis*	Xyridaceae	Herb								√	√					√		
638	114	*Youngia japonica*	Asteraceae	Herb						√			√							
639	52	*Zantedeschia aethiopica*	Araceae	Herb	F				√		√			√						
640	559	*Zanthoxylum tetraspermum*	Rutaceae	Strag. shrub	A						√		√					√		
641	187	*Zehneria maysorensis*	Cucurbitaceae	Climber	F						√		√					√	√	

List of Species showing the family, habit with medicinal tag and their status :

ATF-All type of forests, **E**-Endemic, **EP**-Epiphyte, **EX**-Exotic, **G**-Grassland, **M**-Medicinal, **MA**-Marshy, **N**-Native, **NA**-Naturalised, **P**-Planted, **PA**- Parasite, **RL**-Red Listed, **S**-Shola, **SE**-Shola Evergreen, **W**-Weed.

Med Tag- Medicinal Tag : **A**-Ayurveda, **F**-Folk, **H**-Homeopathy, **M**-Modern, **S**-Siddha, **T**-Tibetian, **U**-Unani.

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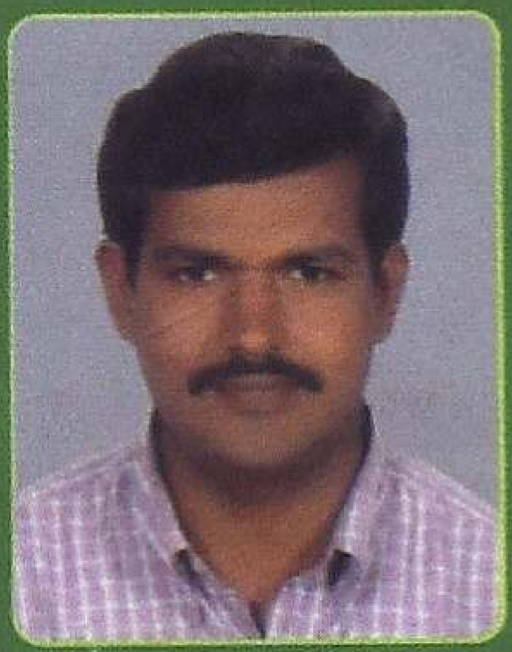

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